ABX MICROS 60

TECHNICAL MANUAL

Part number :
RAA 009 A Ind. B

Accueil

• REVISIONS

INDEX	P/N REVISION	REVISION	SECTION	DATE
A		Creation	all	30/03/98
B	RAH 581 AA	Miscellaneous corrections	1, 3, 4	07/10/98

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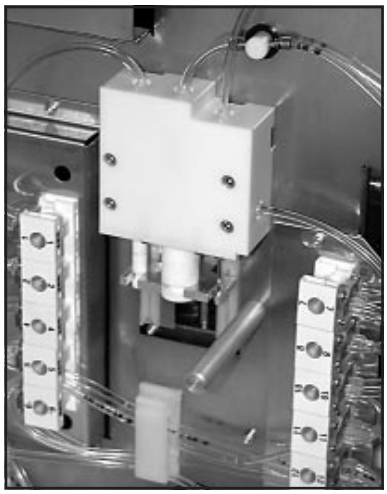
1. HYDRAULIC & PNEUMATIC PRINCIPLES

1. GENERALITIES

MICROS 60 instrument has been designed for simple mechanical operations.
4 stepper motors provide movements to mechanical assemblies.
Pressure and vacuum are provided by the vacuum/waste syringe up and down movements (diag 1).
Liquid movements are achieved either by means of mechanical assembly movements (liquid

Diag.1



Diag.2

syringes diag 2) or pressure/vacuum and simultaneous action of specific valves.

• **Dilution chambers (Diag .3)**
WBC/HGB and RBC chambers are made of GRILAMID TR55 LY injected.
The diode and the cell of the spectrophotometer are glued on the WBC/HGB chamber.
Chamber positions can be modified in order to obtain the best sampling position possible.

Dilutions :
First dilution is carried out in the WBC/HGB chamber (with a bubbling phasis).
The RBC blood sample is aspirated from this dilution.
Lyse is sent from the drain nipple of the WBC/HGB chamber.
Counts have a duration of 2 x 6 seconds.

(see procedures RAS 188 A and RAS 187 A for cycle hydraulic details)

Rinse :
To obtain the best rinse in the counting heads, diluent is sent from the liquid syringes. This is carried out before, between and after the two counts.

IMPORTANT

A window on the HGB/WBC chamber allows the needle to move down into the chamber and to inject reagents. As important light or variation of light can cause HGB result drifts, close instrument cover and door before running blood analyses.

Bubbling :
Insulators avoid polluted liquid overflows during bubbling phasis. they also allows an accurate adjustment of the bubbling volume.

MICROS 60 CT specifics :
- The piercing needle is equipped with two injectors to obtain a homogeneous diluent flow during needle rinsing phasis (see procedures RAS 188 A and RAS 187 A).
- Atmosphere is provided to sample tubes to allow a correct aspiration of blood.

2. MICROS 60 OT HYDRAULIC

Liquid circuits, hydropneumatic connections, as well as the transmission tubes used, are described in the following chart tables.

2.1. With bottles

2.1.1. Transmission tubes list

DESIGNATION	PART NUMBER	DIAMETER	LENGTH	QUANTITY
SLEEVE HPS3	DBD005A	5-9		0.5
T CONNECTOR	EAB006B	2.3		3
T CONNECTOR	EAB032A	1.5		1
TUBE CAP	EAC017A	2.5		1
TYGON TUBE 0.051"	EAE006A	1.30	140	1
TYGON TUBE 0.051"	EAE006A	1.30	350	1
TYGON TUBE 0.060"	EAE007A	1.52	20	1
TYGON TUBE 0.060"	EAE007A	1.52	40	3
TYGON TUBE 0.060"	EAE007A	1.52	50	1
TYGON TUBE 0.060"	EAE007A	1.52	60	1
TYGON TUBE 0.060"	EAE007A	1.52	70	2
TYGON TUBE 0.060"	EAE007A	1.52	80	1
TYGON TUBE 0.060"	EAE007A	1.52	150	1
TYGON TUBE 0.060"	EAE007A	1.52	170	1
TYGON TUBE 0.060"	EAE007A	1.52	220	1
TYGON TUBE 0.060"	EAE007A	1.52	240	1
TYGON TUBE 0.060"	EAE007A	1.52	300	1
TYGON TUBE 0.060"	EAE007A	1.52	370	1
TYGON TUBE 0.060"	EAE007A	1.52	410	1
TYGON TUBE 0.060"	EAE007A	1.52	450	2
TYGON TUBE 0.060"	EAE007A	1.52	480	1
TYGON TUBE 0.081"	EAE008A	2.05	20	1
TYGON TUBE 0.081"	EAE008A	2.05	35	1
TYGON TUBE 0.081"	EAE008A	2.05	200	1
TYGON TUBE 0.081"	EAE008A	2.05	330	1
TYGON TUBE 0.081"	EAE008A	2.05	1080	1
TYGON TUBE 0.090"	EAE009A	2.28	20	2
TYGON TUBE 0.090"	EAE009A	2.28	50	1
TYGON TUBE 0.090"	EAE009A	2.28	60	2
TYGON TUBE 0.090"	EAE009A	2.28	120	1
TYGON TUBE 0.090"	EAE009A	2.28	140	1
TYGON TUBE 0.090"	EAE009A	2.28	150	1
TYGON TUBE 0.090"	EAE009A	2.28	190	1
BLUE TYGON TUBE 0.090"	EAE036A	2.28	1100	1
SLEEVE	GAL098A			30
TUBE SHIELD	GBC088A	4.4	30	1
TUBE SHIELD	GBC088A	4.4	60	1

2.1.2. Hydropneumatic connections

CIRCUIT	FROM	SLEEVE	DIAM	LENGTH	TO	SLEEVE
AIR	(atmosphere)		2.28	190	Liquid valve 2_2	
	Liquid valve 2_1	Y	2.28	50	Waste-chamb._1	Y
	Waste-chamb._2		2.28	20	Cap EAC017A	
DILUENT	Diluent input		2.05	330	Liquid valve11_1	
	Liquid valve11_3	Y	1.52	220	Temp. sensor xba281a	Y
	Temp. sensor. xba281a	Y	1.52	40	Liquid syringes_3	Y
	Liquid valve11_2	Y	1.52	40	Liquid valve10_3	Y
	Liquid valve10_1	Y	1.52	70	Liquid valve7_3	Y
	Liquid valve7_1	Y	1.52	370	needle rinsing block._2	
	Needle rinsing block._1		1.52	410	Liquid valve8_1	
	Liquid valve8_2	Y	1.52	300	Waste-chamb._3	
	Liquid valve 7_2	Y	1.52	240	Té 2.3_1	
	Té 2.3_2		1.52	50	Bac WBC/HGB_3	
	Liquid valve10_2	Y	1.30	140	Liquid syringes_1	Y
	Liquid syringes_2	Y	1.30	350	needle_1	
	Liquid syringes_2	Y			Needle_1	Y
CLEAN	Clean bottle		2.28	1100 blue	Liquid valve4_2	Y
	Liquid valve4_1	Y	1.52	450	T connector 2.3_3	
LYSE	Lyse bottle		2.05	1080	liquid valve 1_1	
	Liquid valve1_3		1.52	150	Liquid syringes _4	
	Liquid valve1_2		1.52	480	WBC grounding connector	
	WBC grounding connector		1.52	20	T connector 1.5_1	
WBC/RBC COUNTING	WBC/HGB_2 chamber		1.52	170	RBC_3 chamber	
	RBC_2 chamber		1.52	450	liquid valve 6_2	Y
	Liquid valve 6_1	Y	1.52	60	Waste-chamb._4	
DRAIN/BUBBLING	WBC/HGB_1 chamber		1.52	40	T connector 1.5_2	
	WBC/HGB_1 chamber		gbc088a	30	T connector 1.5_2	
	T connector 1.5_3		1.52	80	Insulator WBC_1	
	Insulator WBC_2		2.28	120	liquid valve12_2	Y
	Liquid valve12_1	Y	2.05	35	T connector 2.3_1	
	RBC_1 chamber		1.52	70	Insulator RBC_1	
	RBC_1 chamber		gbc088a	60	Insulator RBC_1	
	Insulator RBC_2		2.28	150	liquid valve13_2	Y
	Liquid valve13_1	Y	2.05	20	T connector 2.3_2	
	T connector 2.3_3		2.05	200	T connector 2.3_2	
	T connector 2.3_3		2.28	20	Cell xba199a	Y
	Cell xba199a	Y	2.28	60	Waste-chamb._5	Y
	T connector 2.3_1		2.28	60	Liquid valve5_2	Y
	Liquid valve5_1		2.28	140	Waste ouput	

NOTE Read this table as follows in this example :
The Liquid valve 7_2 corresponds to the ouput 2 of the valve number 7 (see attached pneumatic diagram).

2.2. Pack

2.2.1. Transmission tubes list

DESIGNATION	PART NUMBER	DIAMETER	LENGTH	QUANTITY
SLEEVE HPS3	DBD005A	5-9		0.5
T CONNECTOR	EAB006B	2.3		3
T CONNECTOR	EAB032A	1.5		1
TUBE CAP	EAC017A	2.5		1
TYGON TUBE 0.051"	EAE006A	1.30	140	1
TYGON TUBE 0.051"	EAE006A	1.30	350	1
TYGON TUBE 0.060"	EAE007A	1.52	20	1
TYGON TUBE 0.060"	EAE007A	1.52	40	3
TYGON TUBE 0.060"	EAE007A	1.52	50	1
TYGON TUBE 0.060"	EAE007A	1.52	60	1
TYGON TUBE 0.060"	EAE007A	1.52	70	2
TYGON TUBE 0.060"	EAE007A	1.52	80	1
TYGON TUBE 0.060"	EAE007A	1.52	150	1
TYGON TUBE 0.060"	EAE007A	1.52	170	1
TYGON TUBE 0.060"	EAE007A	1.52	220	1
TYGON TUBE 0.060"	EAE007A	1.52	240	1
TYGON TUBE 0.060"	EAE007A	1.52	300	1
TYGON TUBE 0.060"	EAE007A	1.52	370	1
TYGON TUBE 0.060"	EAE007A	1.52	410	1
TYGON TUBE 0.060"	EAE007A	1.52	450	2
TYGON TUBE 0.060"	EAE007A	1.52	480	1
TYGON TUBE 0.081"	EAE008A	2.05	20	1
TYGON TUBE 0.081"	EAE008A	2.05	35	1
TYGON TUBE 0.081"	EAE008A	2.05	200	1
TYGON TUBE 0.081"	EAE008A	2.05	590	1
TYGON TUBE 0.090"	EAE009A	2.28	20	2
TYGON TUBE 0.090"	EAE009A	2.28	50	1
TYGON TUBE 0.090"	EAE009A	2.28	60	2
TYGON TUBE 0.090"	EAE009A	2.28	120	1
TYGON TUBE 0.090"	EAE009A	2.28	150	1
TYGON TUBE 0.090"	EAE009A	2.28	190	1
TYGON TUBE 0.090"	EAE009A	2.28	510	1
TYGON TUBE 0.090"	EAE009A	2.28	550	1
TYGON TUBE 0.090"	EAE009A	2.28	1100	1
SLEEVE	GAL098A			31
TUBE SHIELD	GBC088A	4.4	30	1
TUBE SHIELD	GBC088A	4.4	60	1
METALLIC SHEATH	GBC170A	5.2	35	3

2.2.2. Hydropneumatic connections

CIRCUIT	FROM	SLEEVE	DIAMETER	LENGTH	TO	SLEEVE
AIR	(atmosphere)		2.28	190	Liquid valve 2_2	
	Liquid valve 2_1	Y	2.28	50	Waste-chamb._1	Y
	Waste-chamb._2		2.28	20	cap EAC017A	
DILUENT	Pack_3 (Diluent)		2.28	550	Liquid valve 11_1	Y
	Pack_3 (Diluent)		gbc170a			
	Liquid valve 11_3	Y	1.52	220	temp. sensor xba281a	Y
	temp. sensor xba281a	Y	1.52	40	Liquid syringes _3	Y
	Liquid valve 11_2	Y	1.52	40	Liquid valve 10_3	Y
	Liquid valve 10_1	Y	1.52	70	Liquid valve 7_3	Y
	Liquid valve 7_1	Y	1.52	370	Needle rinsing block_2	
	needle rinsing block._1		1.52	410	Liquid valve 8_1	
	Liquid valve 8_2	Y	1.52	300	Waste-chamb._3	
	Liquid valve 7_2	Y	1.52	240	T connector 2.3_1	
	T connector 2.3_2		1.52	50	Bac WBC/HGB_3	
	Liquid valve 10_2	Y	1.30	140	Liquid syringes _1	Y
	Liquid syringes _2	Y	1.30	350	NEEDLE_1	
	Liquid syringes _2	Y			NEEDLE_1	Y
CLEAN	Pack-1 (Clean)		2.28	510	Liquid valve 4_2	Y
	Pack-1 (Clean)		gbc170a			
	Liquid valve 4_1	Y	1.52	450	T connector 2.3_3	
LYSE	Pack_2 (Lyse)		2.05	590	Liquid valve 1_1	
	Pack_2 (Lyse)		gbc170a			
	Liquid valve 1_3		1.52	150	Liquid syringes _4	
	Liquid valve 1_2		1.52	480	WBC grounding connector	
	WBC grounding connector		1.52	20	T connector 1.5_1	
WBC/RBC counting	WBC/HGB chamber _2		1.52	170	RBC chamber _3	
	RBC chamber _2		1.52	450	Liquid valve 6_2	Y
	Liquid valve 6_1	Y	1.52	60	Waste-chamb._4	
DRAIN / BUBBLING	WBC/HGB chamber _1		1.52	40	T connector 1.5_2	
	WBC/HGB chamber _1		gbc088a	30	T connector 1.5_2	
	T connector 1.5_3		1.52	80	Insulator WBC_1	
	Insulator WBC_2		2.28	120	Liquid valve 12_2	Y
	Liquid valve 12_1	Y	2.05	35	T connector 2.3_1	
	Bac RBC_1		1.52	70	Insulator RBC_1	
	Bac RBC_1		gbc088a	60	Insulator RBC_1	
	Insulator RBC_2		2.28	150	Liquid valve 13_2	Y
	Liquid valve 13_1	Y	2.05	20	T connector 2.3_2	
	T connector 2.3_3		2.05	200	T connector 2.3_2	
	T connector 2.3_3		2.28	20	Cellule xba199a	Y
	Cell xba199a	Y	2.28	60	Waste-chamb._5	Y
	T connector 2.3_1		2.28	60	Liquid valve 5_2	Y
	Liquid valve 5_1		2.28	1100	Pack_4 (Waste)	

NOTE Read this table as follows in this example :
The Liquid valve 7_2 corresponds to ouput 2 of the valve number 7 (see attached pneumatic diagram).

2.3. Hydraulic cycle description

2.3.1. Atmosphere circuit

2.3.2. Diluent circuit

2.3.3. Clean circuit

2.3.4. Lyse circuit

2.3.5. WBC/RBC counting circuit

2.3.6. Drain/bubbling circuit

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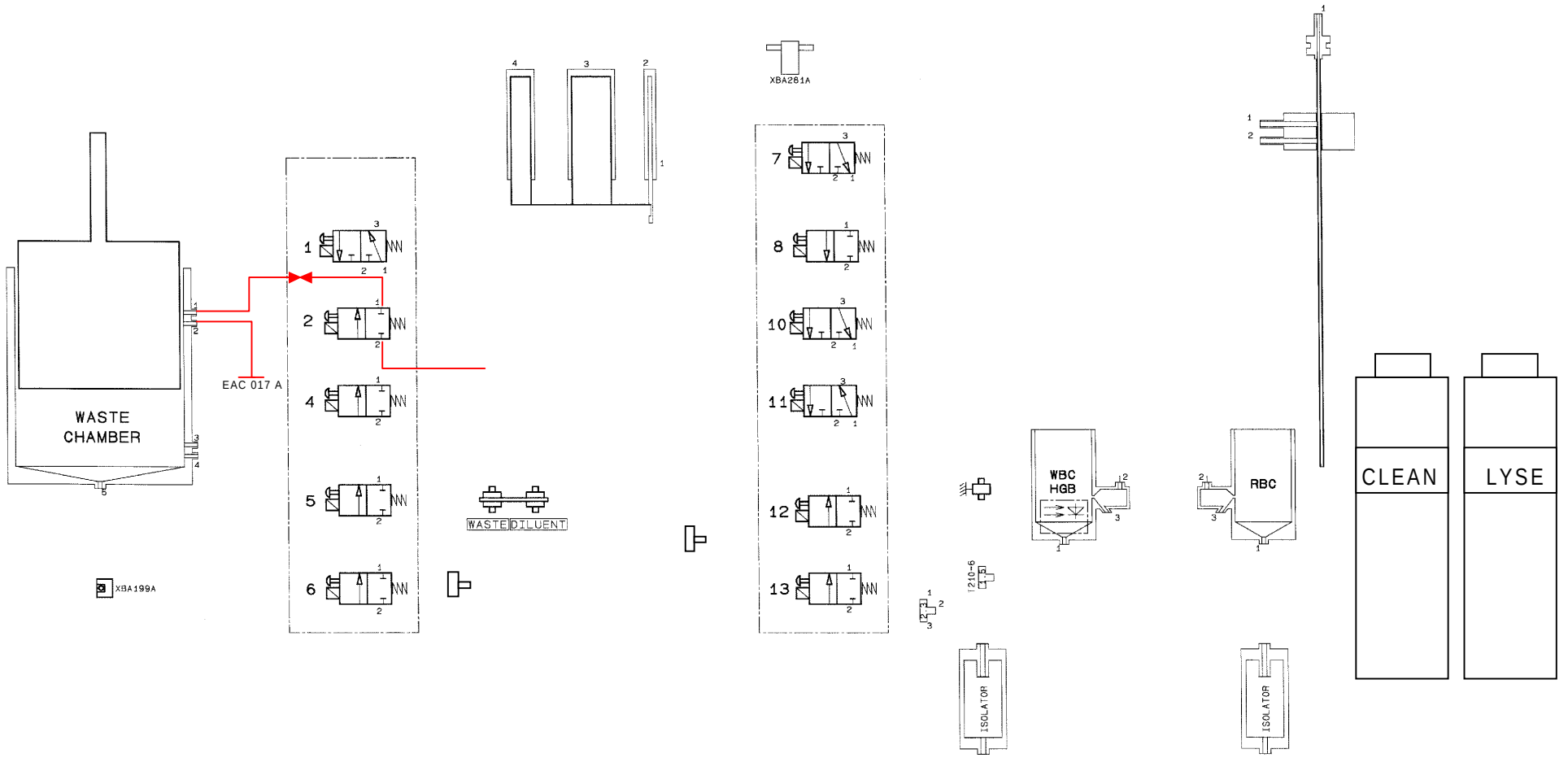
ATMOSPHERE CIRCUIT



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0.030"	0.76mm	0.081"	2.05mm
0.035"	0.89mm	0.090"	2.28mm
0.040"	1.02mm	0.100"	2.54mm

C: tube Cristal
P: tube Polyuréthane
: tube Tygon
S: tube Silicone
V: tube Viton

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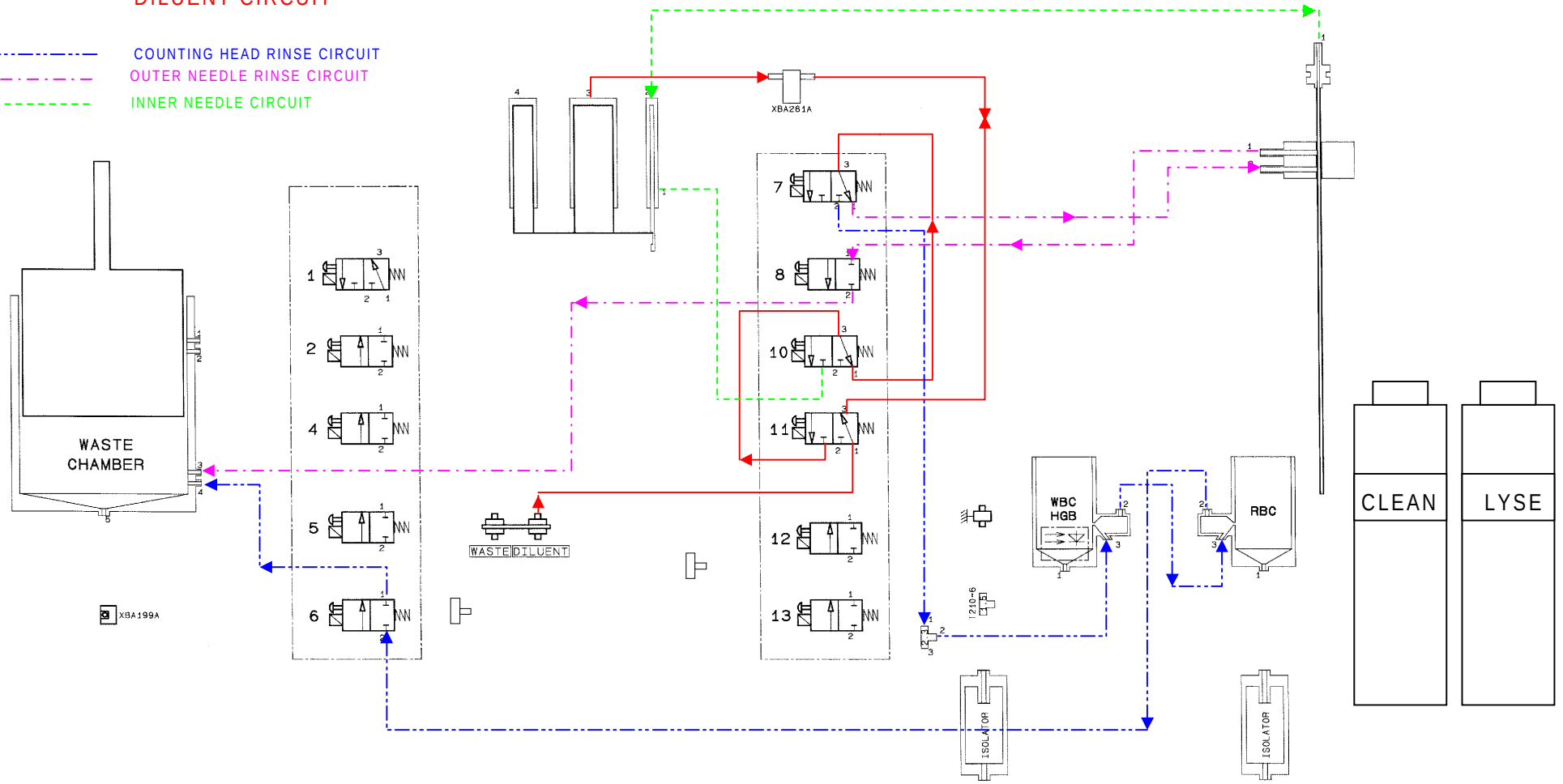
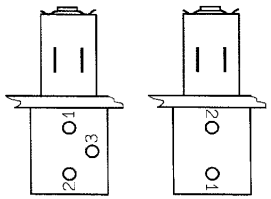
DILUENT CIRCUIT

COUNTING HEAD RINSE CIRCUIT
OUTER NEEDLE RINSE CIRCUIT
INNER NEEDLE CIRCUIT





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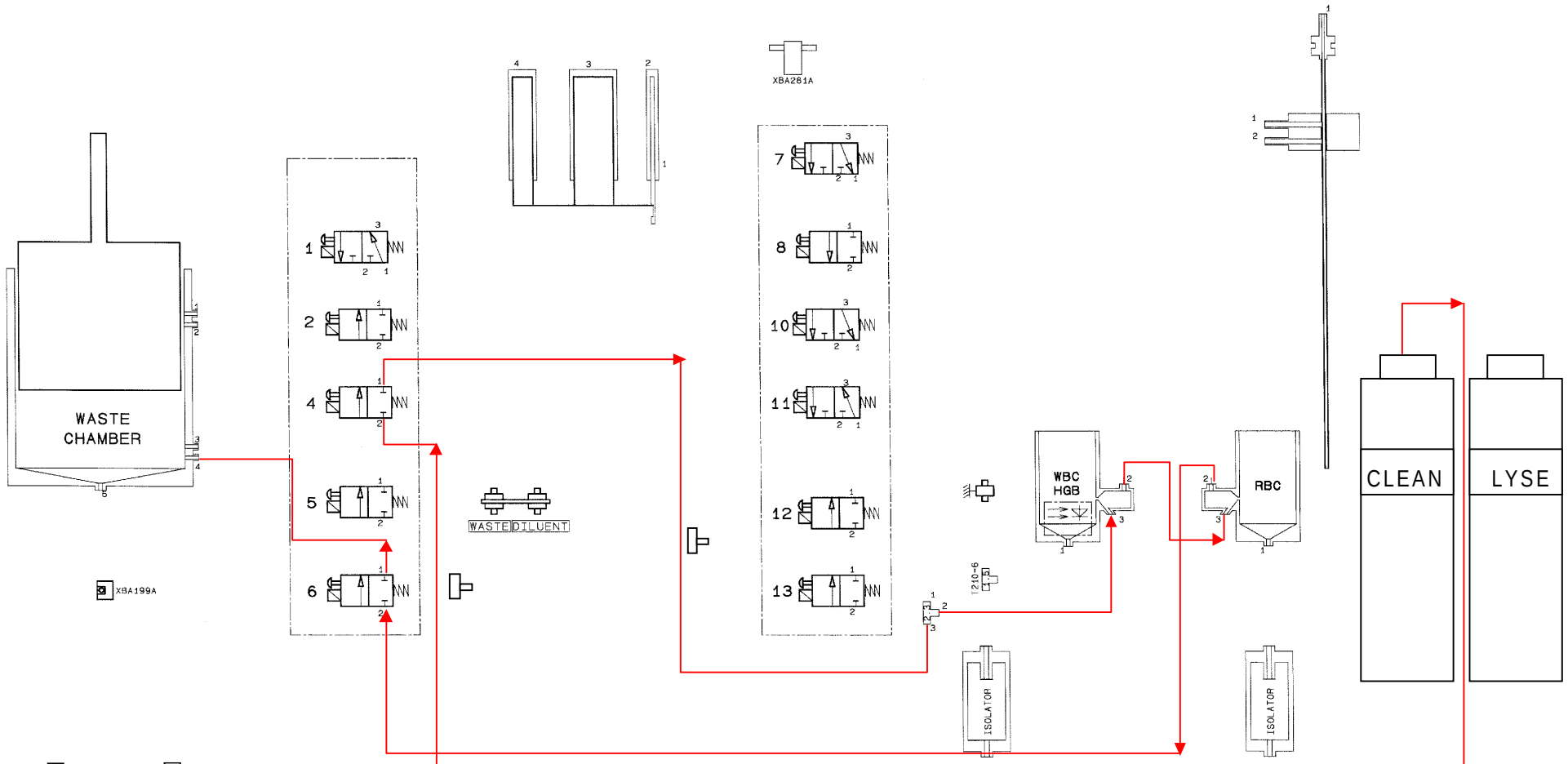
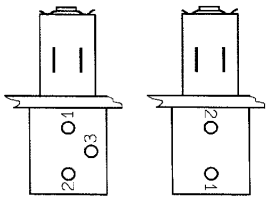
CLEAN CIRCUIT





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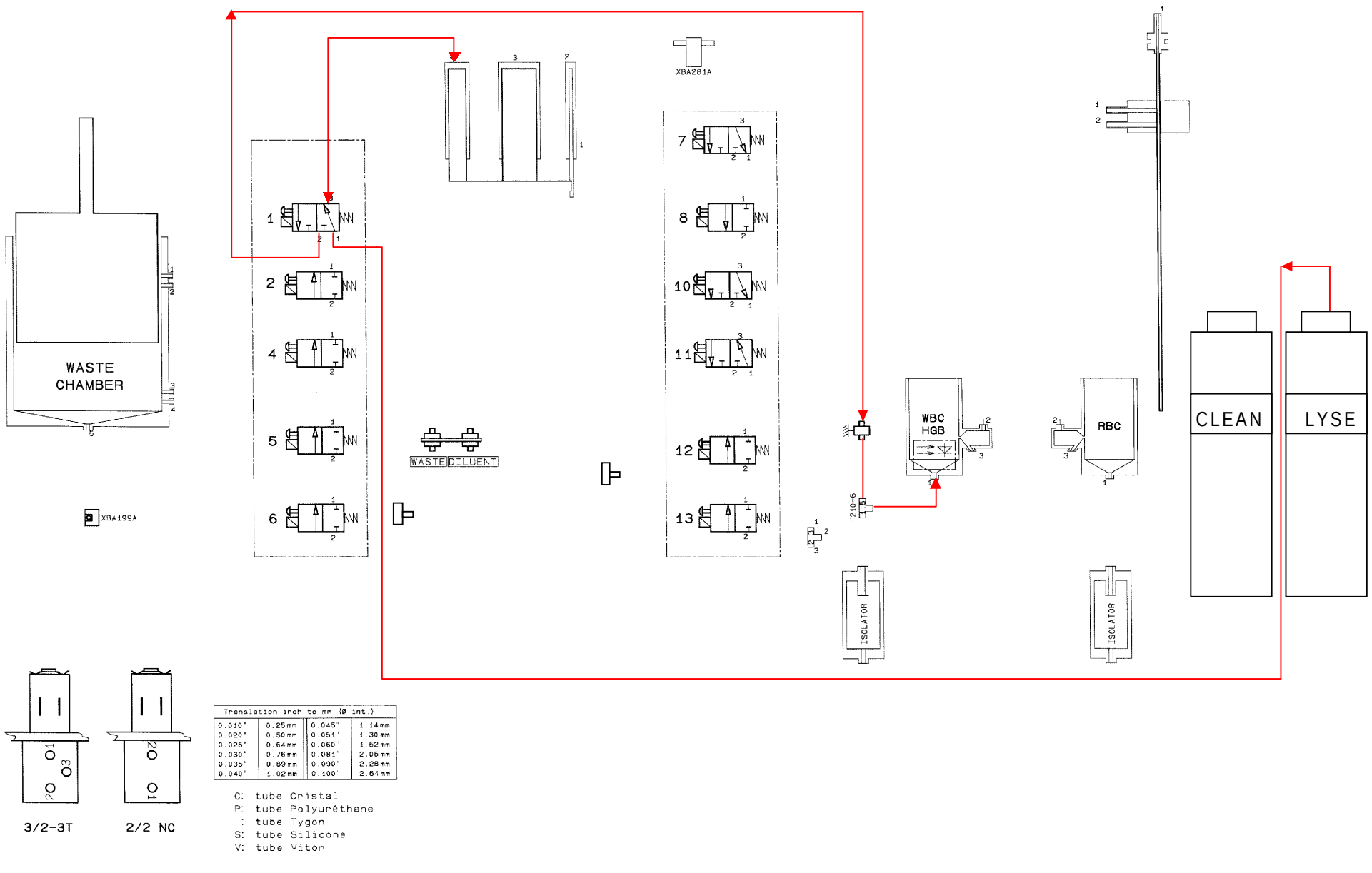
LYSE CIRCUIT



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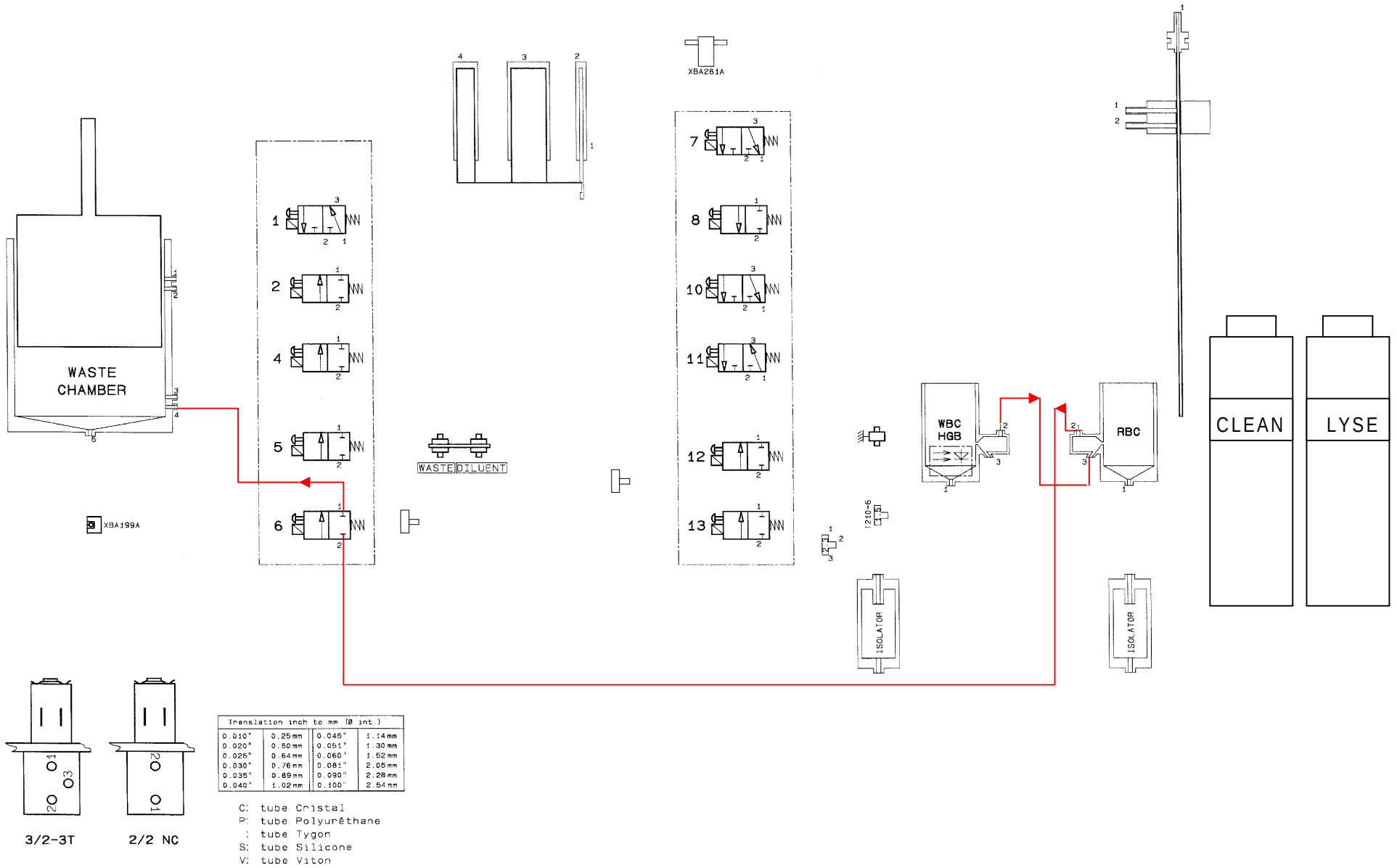
WBC / RBC COUNTING PHASIS



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: tube Tygon
S: tube Silicone
V: tube Viton

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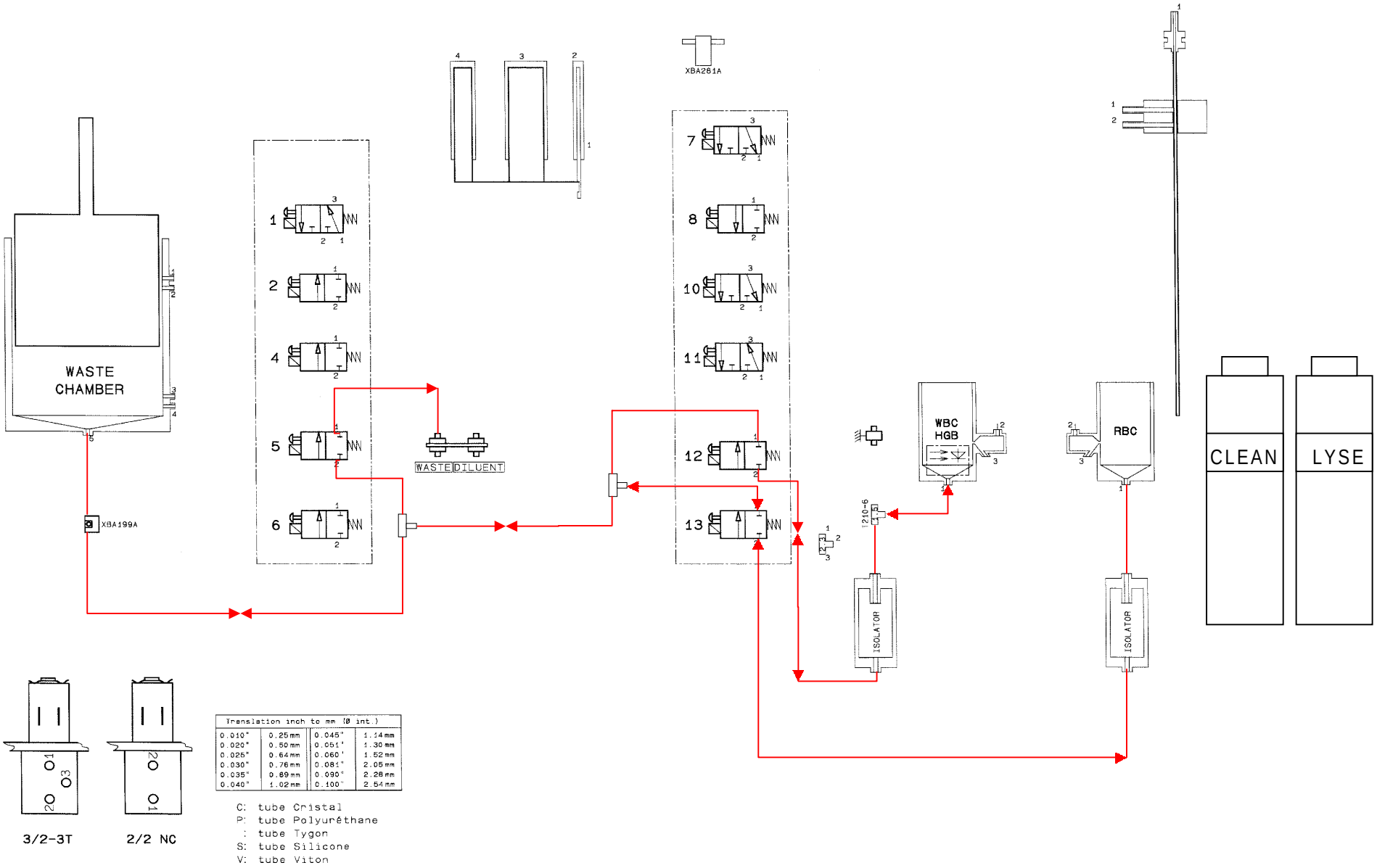
DRAIN / BUBBLING CIRCUIT



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C: tube Cristal
P: tube Polyuréthane
: tube Tygon
S: tube Silicone
V: tube Viton

3. MICROS 60 CT HYDRAULIC

3.1. With bottles

3.1.1. Transmission tubes list

DESIGNATION	PART NUMBER	DIAMETER	LENGTH	QUANTITY
T CONNECTOR	EAB006B	2.3		4
STRAIGHT CONNECTOR	EAB015A	1.5/2.5		3
T CONNECTOR	EAB032A	1.5		2
TUBE CAP	EAC017A	2.5		1
TYGON TUBE 0.040"	EAE005A	1.02	110	1
TYGON TUBE 0.040"	EAE005A	1.02	335	1
TYGON TUBE 0.060"	EAE007A	1.52	15	3
TYGON TUBE 0.060"	EAE007A	1.52	20	2
TYGON TUBE 0.060"	EAE007A	1.52	40	4
TYGON TUBE 0.060"	EAE007A	1.52	50	2
TYGON TUBE 0.060"	EAE007A	1.52	60	1
TYGON TUBE 0.060"	EAE007A	1.52	70	2
TYGON TUBE 0.060"	EAE007A	1.52	80	1
TYGON TUBE 0.060"	EAE007A	1.52	100	1
TYGON TUBE 0.060"	EAE007A	1.52	150	1
TYGON TUBE 0.060"	EAE007A	1.52	170	1
TYGON TUBE 0.060"	EAE007A	1.52	220	1
TYGON TUBE 0.060"	EAE007A	1.52	240	1
TYGON TUBE 0.060"	EAE007A	1.52	420	2
TYGON TUBE 0.060"	EAE007A	1.52	450	2
TYGON TUBE 0.060"	EAE007A	1.52	480	1
TYGON TUBE 0.081"	EAE008A	2.05	20	1
TYGON TUBE 0.081"	EAE008A	2.05	35	1
TYGON TUBE 0.081"	EAE008A	2.05	200	1
TYGON TUBE 0.081"	EAE008A	2.05	330	1
TYGON TUBE 0.081"	EAE008A	2.05	650	1
TYGON TUBE 0.081"	EAE008A	2.05	1080	1
TYGON TUBE 0.090"	EAE009A	2.28	20	2
TYGON TUBE 0.090"	EAE009A	2.28	50	1
TYGON TUBE 0.090"	EAE009A	2.28	60	3
TYGON TUBE 0.090"	EAE009A	2.28	120	1
TYGON TUBE 0.090"	EAE009A	2.28	140	1
TYGON TUBE 0.090"	EAE009A	2.28	150	1
TYGON TUBE 0.090"	EAE009A	2.28	190	1
SILICONE TUBE	EAE025A	1.5/3.5	50	2
BLUE TYGON TUBE 0.090"	EAE036A	2.28	1100	1
SLEEVE	GAL098A			32
TUBE SHIELD	GBC088A	4.4	30	1
TUBE SHIELD	GBC088A	4.4	60	1

3.1.2. Hydropneumatic connections

CIRCUIT	FROM	SLEEVE	DIAMETER	LENGTH	TO	SLEEVE
AIR	(atmosphere)		2.28	190	Liquid valve 2_2	
	Liquid valve 2_1	Y	2.28	50	Waste-chamb._1	Y
	Waste-chamb._2		2.28	20	cap EAC017A	
	(atmosphere)		2.28	60	Liquid valve 3_2	
	Liquid valve 3_1		1.52	40	T connector 2.3_1	
DILUENT	Diluent input		2.05	330	Liquid valve 11_1	
	Liquid valve 11_3	Y	1.52	220	temp sensor. xba281a	Y
	temp sensor. xba281a	Y	1.52	40	liquid syringes_3	Y
	Liquid valve 11_2	Y	1.52	40	Liquid valve 10_3	Y
	Liquid valve 10_1	Y	1.52	70	Liquid valve 7_3	Y
	Liquid valve 7_1	Y	1.52	50	Liquid valve 9_3	Y
	Liquid valve 9_1	Y	1.52	420	Needle rinsing block._2	
	Liquid valve 9_2	Y	1.52	420	T connector 1.5_2	
	T connector 1.5_1		S1.5/3.5	50	Needle rinsing block._3	
	T connector 1.5_3		S1.5/3.5	50	Needle rinsing block._4	
	Liquid valve 7_2	Y	1.52	240	T connector 2.3_1	
	T connector 2.3_2		1.52	50	WBC/HGB chamber_3	
	Liquid valve 10_2	Y	1.52	15	Connector 1.5/2.5	
	Connector 1.5/2.5		1.02	110	Connector 1.5/2.5	
	Connector 1.5/2.5		1.52	15	liquid syringes_1	Y
	liquid syringes_2	Y	1.52	15	Connector 1.5/2.5	
	Connector 1.5/2.5		1.02	335	needle_1	
	Connector 1.5/2.5	Y			needle_1	Y
	Needle rinsing block._1		1.52	100	T connector 2.3_3	
	T connector 2.3_2		1.52	20	Liquid valve 8_1	
	Liquid valve 8_2		2.05	650	Waste-chamb._3	
CLEAN	Clean bottle		2.28	1100 blue	Liquid valve 4_2	Y
	Liquid valve 4_1	Y	1.52	450	T connector 2.3_3	
LYSE	Lyse bottle		2.05	1080	Liquid valve 1_1	
	Liquid valve 1_3		1.52	150	liquid syringes_4	
	Liquid valve 1_2		1.52	480	WBC grounding connector	
	WBC grounding connector		1.52	20	T connector 1.5_1	
WBC/RBC counting	WBC/HGB chamber _2		1.52	170	RBC chamber_3	
	RBC chamber_2		1.52	450	Liquid valve 6_2	Y
	Liquid valve 6_1	Y	1.52	60	Waste-chamb._4	
DRAIN / BUBBLING	WBC/HGB Chamber_1		1.52	40	T connector 1.5_2	
	WBC/HGB Chamber_1		gbc088a	30	T connector 1.5_2	
	T connector 1.5_3		1.52	80	insulator WBC_1	
	insulator WBC_2		2.28	120	Liquid valve 12_2	Y
	Liquid valve 12_1	Y	2.05	35	T connector 2.3_1	
	RBC_1 chamber		1.52	70	insulator RBC_1	
	RBC_1 chamber		gbc088a	60	insulator RBC_1	
	insulator RBC_2		2.28	150	Liquid valve 13_2	Y
	Liquid valve 13_1	Y	2.05	20	T connector 2.3_2	
	T connector 2.3_3		2.05	200	T connector 2.3_2	
	T connector 2.3_3		2.28	20	Cell xba199a	Y
	Cell xba199a	Y	2.28	60	Waste-chamb._5	Y
	T connector 2.3_1		2.28	60	Liquid valve 5_2	Y
	Liquid valve 5_1		2.28	140	Waste ouput	

NOTE Read this table as follows in this example :
The Liquid valve 7_2 corresponds to ouput 2 of the valve number 7 (see attached pneumatic diagram).

3.2. Pack

3.2.1. Transmission tubes list

DESIGNATION	PART NUMBER	DIAMETER	LENGTH	QUANTITY
T CONNECTOR	EAB006B	2.3		4
STRAIGHT CONNECTOR	EAB015A	1.5/2.5		3
T CONNECTOR	EAB032A	1.5		2
TUBE CAP	EAC017A	2.5		1
TYGON TUBE 0.040"	EAE005A	1.02	110	1
TYGON TUBE 0.040"	EAE005A	1.02	335	1
TYGON TUBE 0.060"	EAE007A	1.52	15	3
TYGON TUBE 0.060"	EAE007A	1.52	20	2
TYGON TUBE 0.060"	EAE007A	1.52	40	4
TYGON TUBE 0.060"	EAE007A	1.52	50	2
TYGON TUBE 0.060"	EAE007A	1.52	60	1
TYGON TUBE 0.060"	EAE007A	1.52	70	2
TYGON TUBE 0.060"	EAE007A	1.52	80	1
TYGON TUBE 0.060"	EAE007A	1.52	100	1
TYGON TUBE 0.060"	EAE007A	1.52	150	1
TYGON TUBE 0.060"	EAE007A	1.52	170	1
TYGON TUBE 0.060"	EAE007A	1.52	220	1
TYGON TUBE 0.060"	EAE007A	1.52	240	1
TYGON TUBE 0.060"	EAE007A	1.52	420	2
TYGON TUBE 0.060"	EAE007A	1.52	450	2
TYGON TUBE 0.060"	EAE007A	1.52	480	1
TYGON TUBE 0.081"	EAE008A	2.05	20	1
TYGON TUBE 0.081"	EAE008A	2.05	35	1
TYGON TUBE 0.081"	EAE008A	2.05	200	1
TYGON TUBE 0.081"	EAE008A	2.05	590	1
TYGON TUBE 0.081"	EAE008A	2.05	650	1
TYGON TUBE 0.090"	EAE009A	2.28	20	2
TYGON TUBE 0.090"	EAE009A	2.28	50	1
TYGON TUBE 0.090"	EAE009A	2.28	60	3
TYGON TUBE 0.090"	EAE009A	2.28	120	1
TYGON TUBE 0.090"	EAE009A	2.28	150	1
TYGON TUBE 0.090"	EAE009A	2.28	190	1
TYGON TUBE 0.090"	EAE009A	2.28	510	1
TYGON TUBE 0.090"	EAE009A	2.28	550	1
TYGON TUBE 0.090"	EAE009A	2.28	1100	1
SILICONE TUBE	EAE025A	1.5/3.5	50	2
SLEEVE	GAL098A			33
TUBE SHIELD	GBC088A	4.4	30	1
TUBE SHIELD	GBC088A	4.4	60	1
METALLIC SHEATH	GBC170A	5.2	35	3

3.2.2. Hydropneumatic connections

CIRCUIT	FROM	SLEEVE	DIAMETER	LENGTH	TO	SLEEVE
AIR	(atmosphere)		2.28	190	Liquid valve 2_2	
	Liquid valve 2_1	Y	2.28	50	Waste-chamb._1	Y
	Waste-chamb._2		2.28	20	cap EAC017A	
	(atmosphere)		2.28	60	Liquid valve 3_2	
	Liquid valve 3_1		1.52	40	T Connector 2.3_1	
DILUENT	Pack_3 (Diluent)		2.28	550	Liquid valve 11_1	Y
	Pack_3 (Diluent)		gbc170a			
	Liquid valve 11_3	Y	1.52	220	Temp. sensor xba281a	Y
	Temp. sensor xba281a	Y	1.52	40	Liquid syringes_3	Y
	Liquid valve 11_2	Y	1.52	40	Liquid valve 10_3	Y
	Liquid valve 10_1	Y	1.52	70	Liquid valve 7_3	Y
	Liquid valve 7_1	Y	1.52	50	Liquid valve 9_3	Y
	Liquid valve 9_1	Y	1.52	420	Needle rinsing block_2	
	Liquid valve 9_2	Y	1.52	420	T Connector 1.5_2	
	T Connector 1.5_1		S1.5/3.5	50	Needle rinsing block_3	
	T Connector 1.5_3		S1.5/3.5	50	Needle rinsing block_4	
	Liquid valve 7_2	Y	1.52	240	T Connector 2.3_1	
	T Connector 2.3_2		1.52	50	Bac WBC/HGB_3	
	Liquid valve 10_2	Y	1.52	15	connector1.5/2.5	
	connector1.5/2.5		1.02	110	connector1.5/2.5	
	connector 1.5/2.5		1.52	15	Liquid syringes_1	Y
	Liquid syringes_2	Y	1.52	15	connector 1.5/2.5	
	connector 1.5/2.5		1.02	335	Needle_1	
	connector 1.5/2.5	Y			Needle_1	Y
	Needle rinsing block_1		1.52	100	T Connector 2.3_3	
	T Connector 2.3_2		1.52	20	Liquid valve 8_1	
	Liquid valve 8_2		2.05	650	Waste-chamb._3	
CLEAN	Pack_1 (Clean)		2.28	510	Liquid valve 4_2	Y
	Pack_1 (Clean)		gbc170a			
	Liquid valve 4_1	Y	1.52	450	T Connector 2.3_3	
LYSE	Pack_2 (Lyse)		2.05	590	Liquid valve 1_1	
	Pack_2 (Lyse)		gbc170a			
	Liquid valve 1_3		1.52	150	Liquid syringes_4	
	Liquid valve 1_2		1.52	480	WBCgrounding connec.	
	WBC grounding connect.		1.52	20	T Connector 1.5_1	
Comptage WBC/RBC	Bac WBC/HGB_2		1.52	170	RBC chamber_3	
	RBC chamber_2		1.52	450	Liquid valve 6_2	Y
	Liquid valve 6_1	Y	1.52	60	Waste-chamb._4	
EVACUAT° / Bullage	Bac WBC/HGB_1		1.52	40	T Connector 1.5_2	
	Bac WBC/HGB_1		gbc088a	30	T Connector 1.5_2	
	T Connector 1.5_3		1.52	80	insulator WBC_1	
	insulator WBC_2		2.28	120	Liquid valve 12_2	Y
	Liquid valve 12_1	Y	2.05	35	T Connector 2.3_1	
	RBC chamber_1		1.52	70	insulator RBC_1	
	RBC chamber_1		gbc088a	60	insulator RBC_1	
	insulator RBC_2		2.28	150	Liquid valve 13_2	Y
	Liquid valve 13_1	Y	2.05	20	T Connector 2.3_2	
	T Connector 2.3_3		2.05	200	T Connector 2.3_2	
	T Connector 2.3_3		2.28	20	CELL xba199a	Y
	CELL xba199a	Y	2.28	60	Waste-chamb._5	Y
	T Connector 2.3_1		2.28	60	Liquid valve 5_2	Y
	Liquid valve 5_1		2.28	1100	Pack_4 (Waste)	

NOTE Read this table as follows in this example :
The Liquid valve 7_2 corresponds to ouput 2 of the valve number 7 (see attached pneumatic diagram)

3.3. Hydraulic cycle description

3.3.1. Atmosphere circuit

3.3.2. Diluent circuit

3.3.3. Clean circuit

3.3.4. Lyse circuit

3.3.5. WBC/RBC counting circuit

3.3.6. Drain/bubbling circuit

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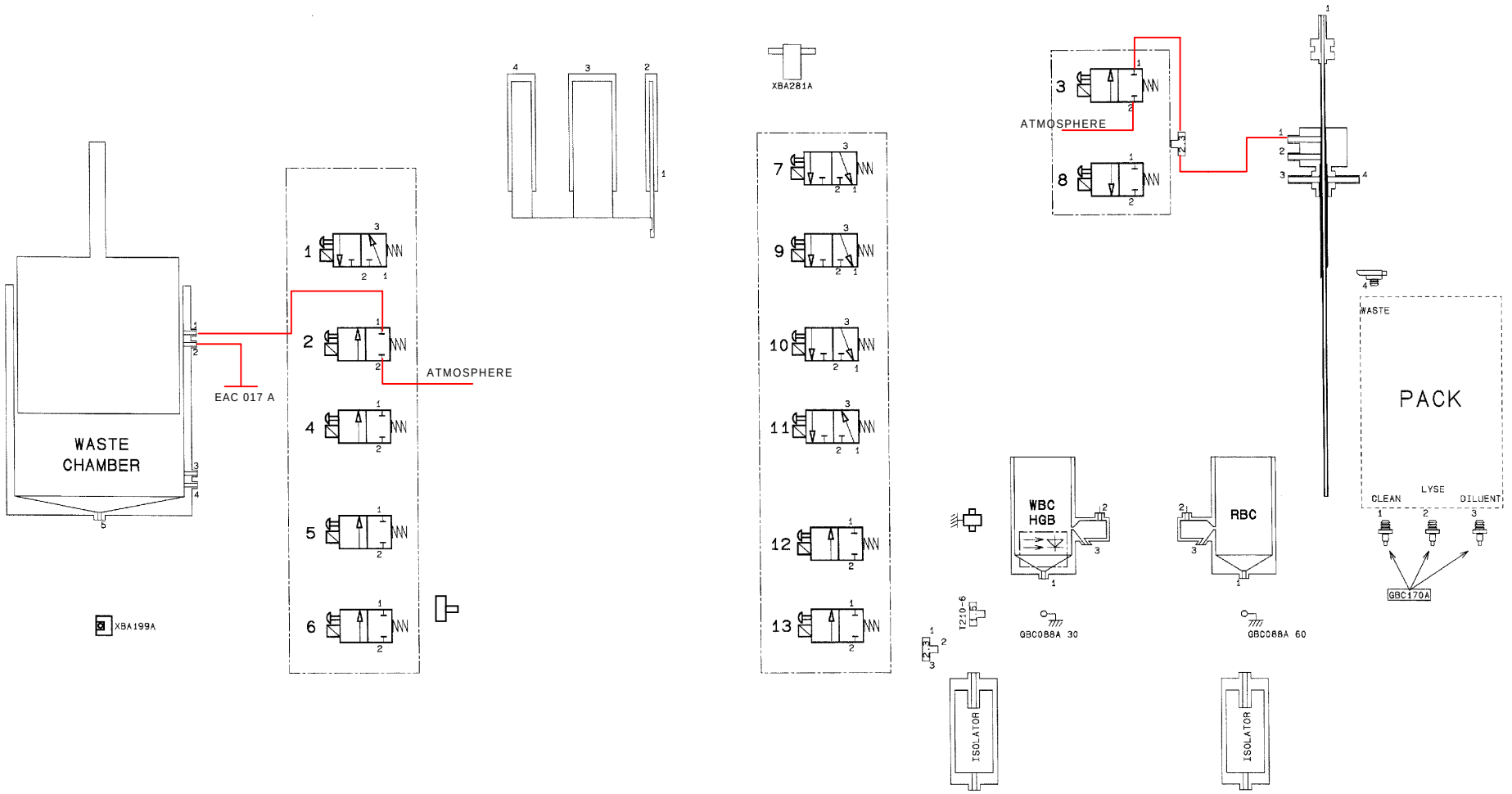
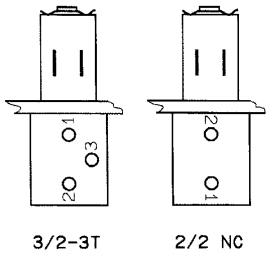
ATMOSPHERE CIRCUIT





Translation inch to mm (Ø int.)			
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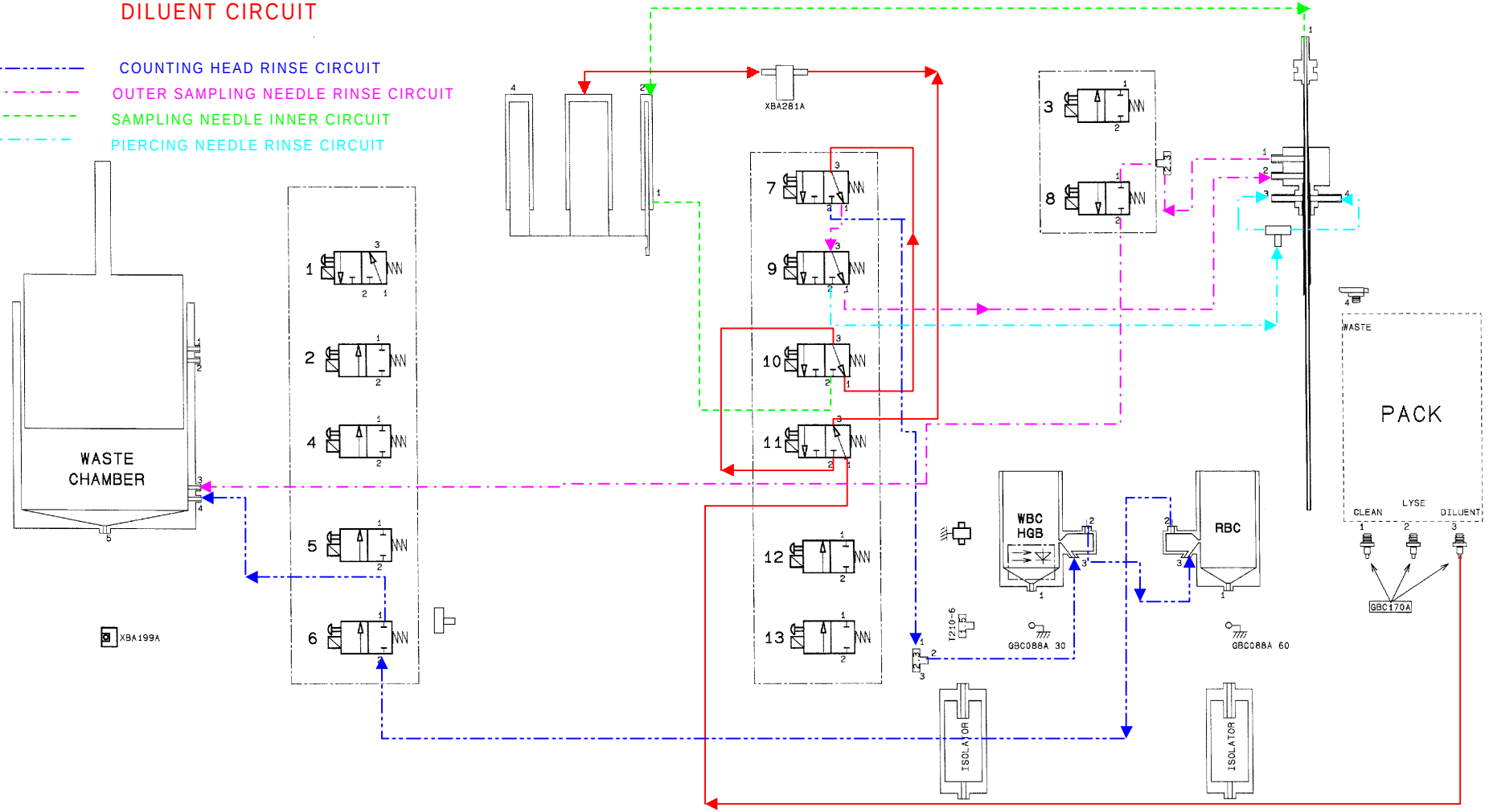
0.020"	0.50mm	0.051"	1.30mm
0.025"	0.64mm	0.060"	1.52mm
0.030"	0.76mm	0.081"	2.05mm
0.035"	0.89mm	0.090"	2.28mm
0.040"	1.02mm	0.100"	2.54mm

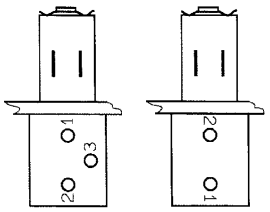
C: tube Cristal
P: tube Polyuréthane
: tube Tygon
S: tube Silicone
V: tube Viton

RAA 009 A ind B

DILUENT CIRCUIT

COUNTING HEAD RINSE CIRCUIT
OUTER SAMPLING NEEDLE RINSE CIRCUIT
SAMPLING NEEDLE INNER CIRCUIT
PIERCING NEEDLE RINSE CIRCUIT





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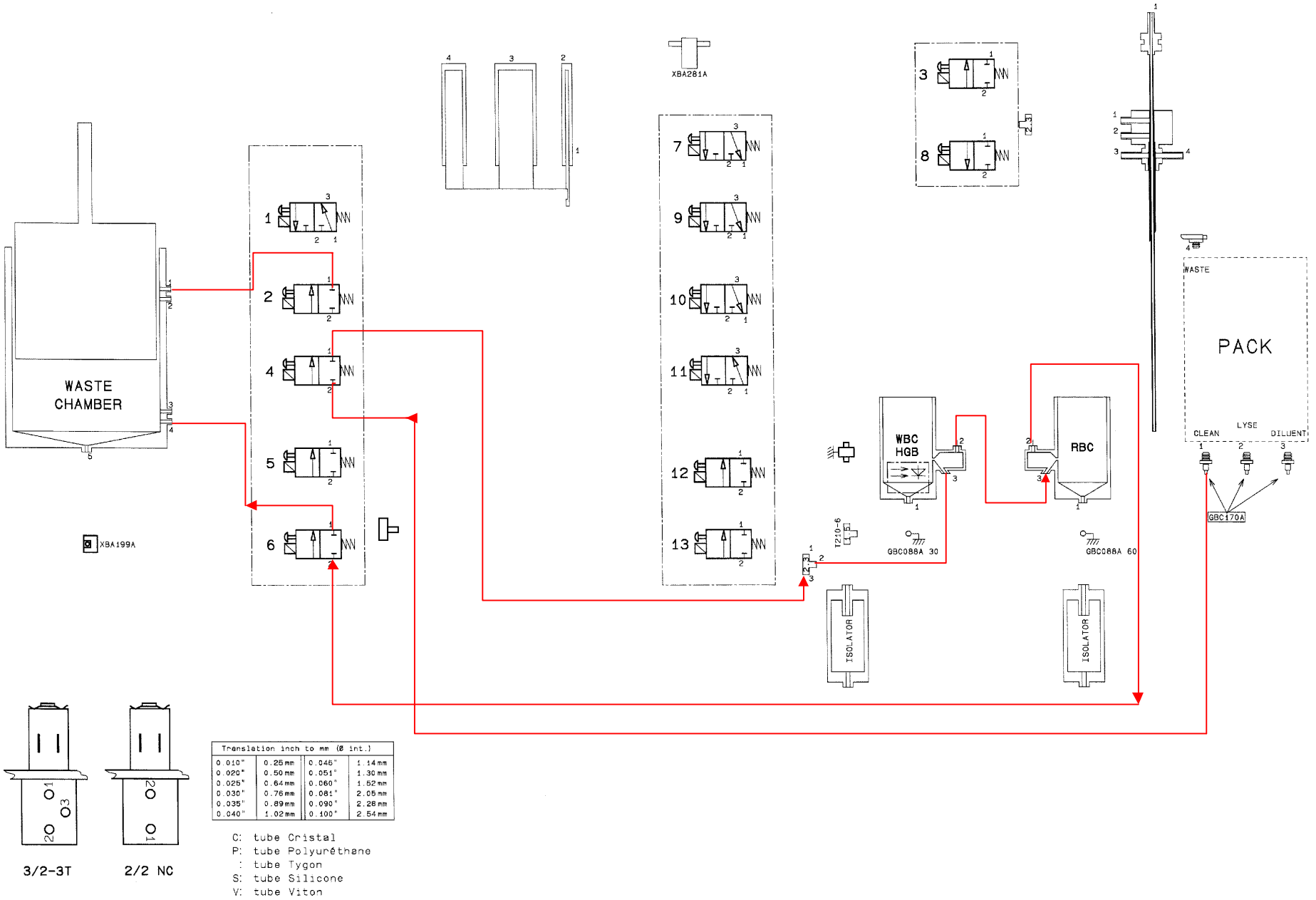
0.040"	1.02mm	0.100"	2.54mm

C: tube Cristal
P: tube Polyuréthane
: tube Tygon
S: tube Silicone
V: tube Viton

RAA 009 A ind B

CLEAN CIRCUIT



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0.030"	0.76mm	0.081"	2.05mm
0.035"	0.89mm	0.090"	2.28mm
0.040"	1.02mm	0.100"	2.54mm

C: tube Cristal
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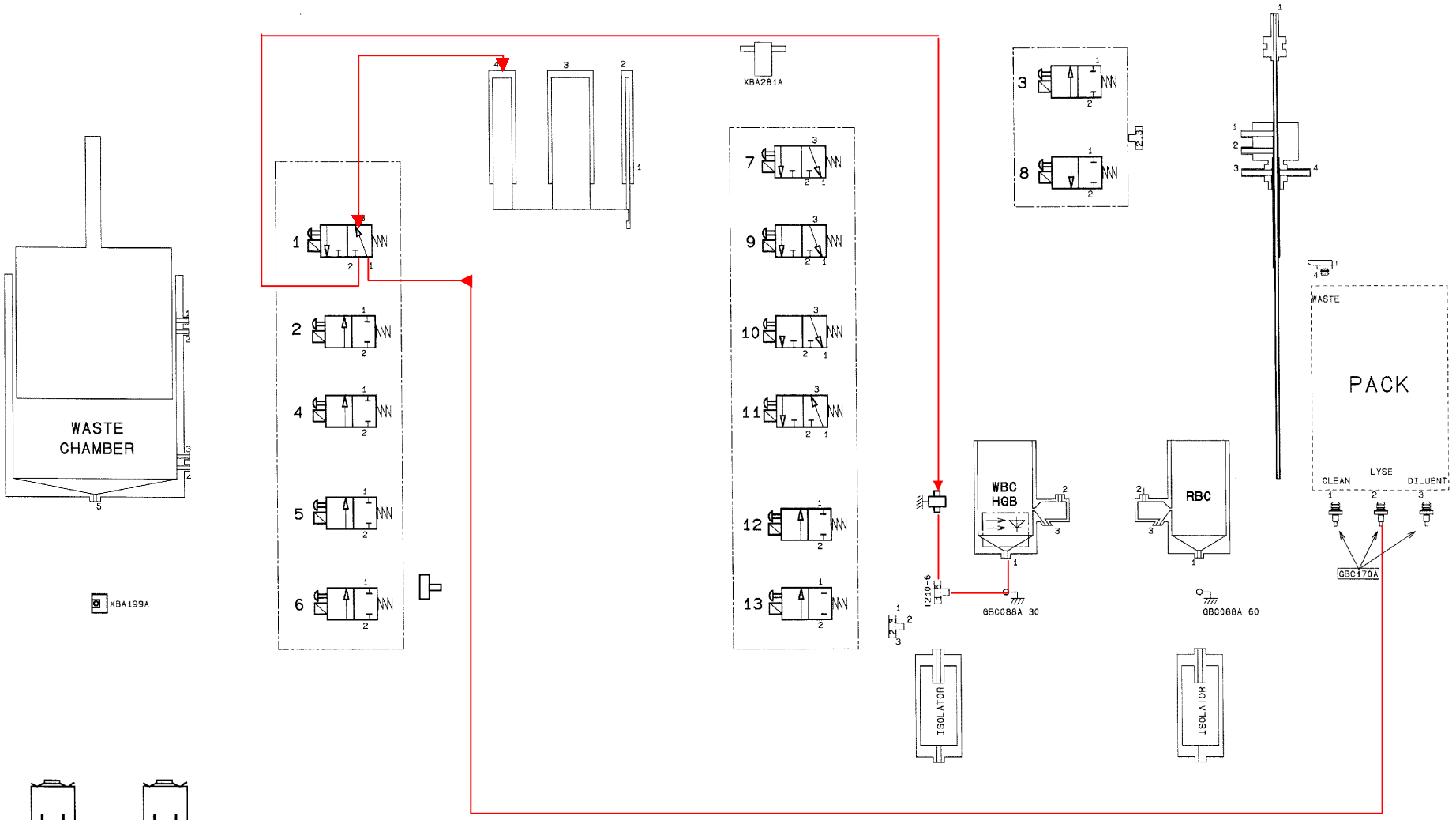
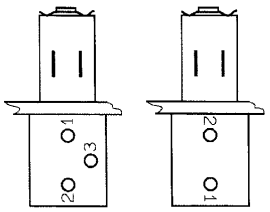
: tube Tygon
S: tube Silicone
V: tube Viton

RAA 009 A ind B

LYSE CIRCUIT





Translation inch to mm (Ø int.)			
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0.020"	0.50 mm	0.051"	1.30 mm
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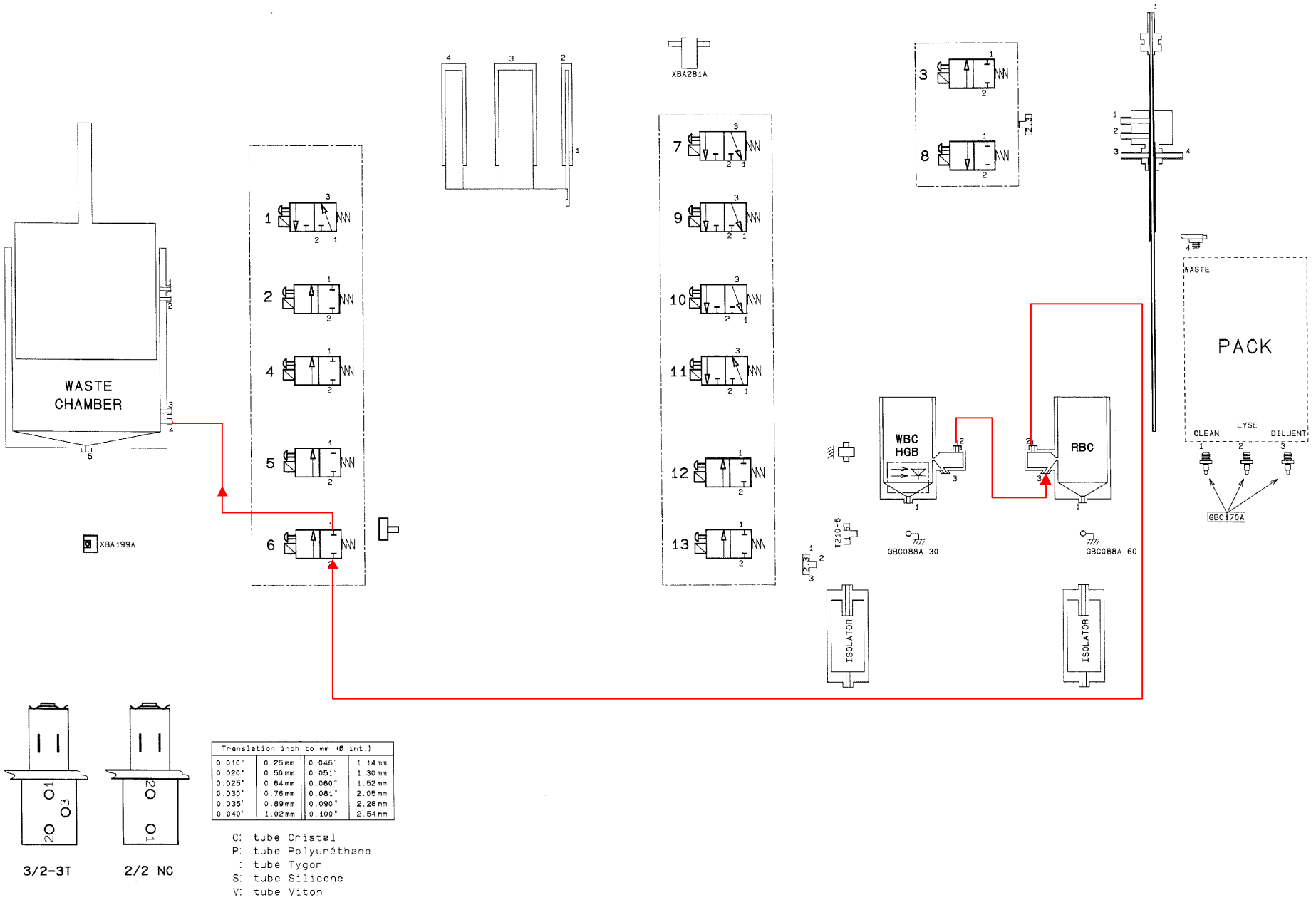
0.030"	0.76 mm	0.081"	2.05 mm
0.035"	0.89 mm	0.090"	2.28 mm
0.040"	1.02 mm	0.100"	2.54 mm

C: tube Cristal
P: tube Polyuréthane
: tube Tygon
S: tube Silicone
V: tube Viton

RAA 009 A ind B

WBC / RBC COUNTING CIRCUIT



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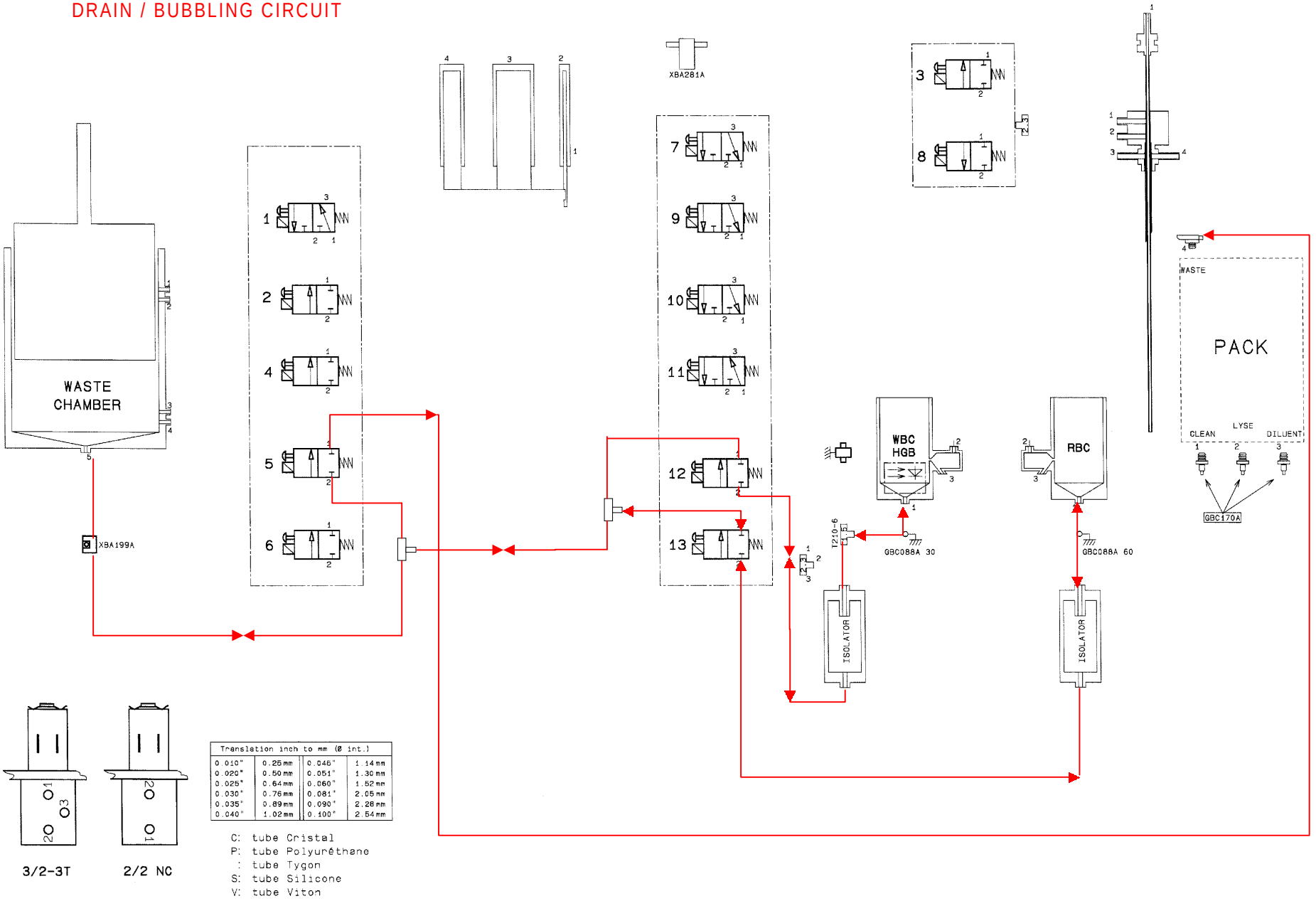
0.020"	0.50mm	0.051"	1.30mm
0.025"	0.64mm	0.060"	1.52mm
0.030"	0.76mm	0.081"	2.05mm
0.035"	0.89mm	0.090"	2.28mm
0.040"	1.02mm	0.100"	2.54mm

C: tube Cristal
P: tube Polyuréthane
: tube Tygon
S: tube Silicone
V: tube Viton

RAA 009 A ind B

DRAIN / BUBBLING CIRCUIT



Translation inch to mm (Ø int.)			
0.010"	0.25mm	0.046"	1.14mm
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0.030"	0.76mm	0.081"	2.05mm
0.035"	0.89mm	0.090"	2.28mm
0.040"	1.02mm	0.100"	2.54mm

C: tube Cristal
P: tube Polyuréthane
: tube Tygon
S: tube Silicone
V: tube Viton

4. PNEUMATIC DIAGRAMS

4.1. Micros 60 CT bottle version

4.2. Micros 60 CT pack version

4.3. Micros 60 OT bottle version

4.4. Micros 60 OT pack version

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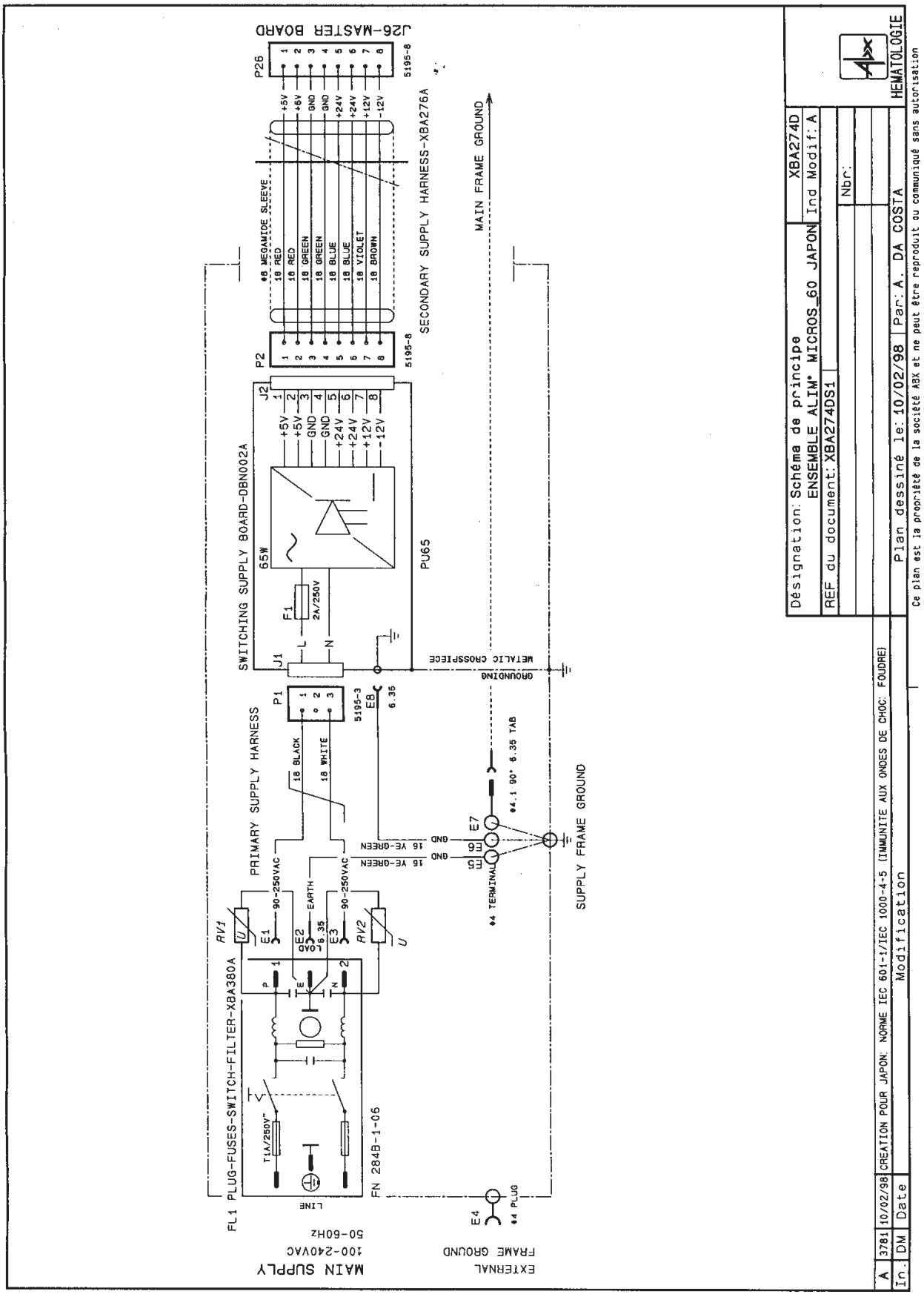
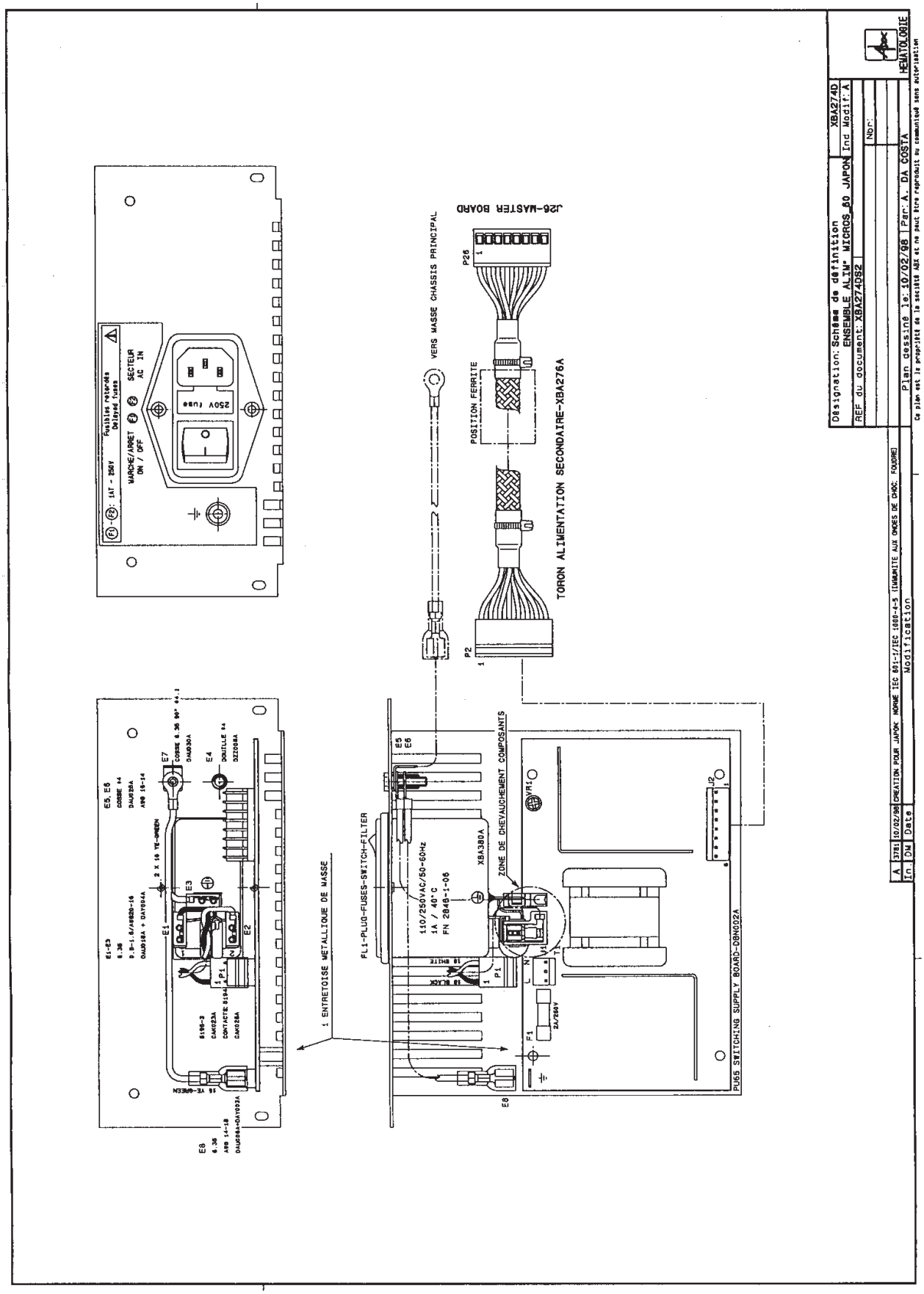
2. ELECTRIC & ELECTRONIC PRINCIPLES

1. POWER SUPPLY ASSEMBLY

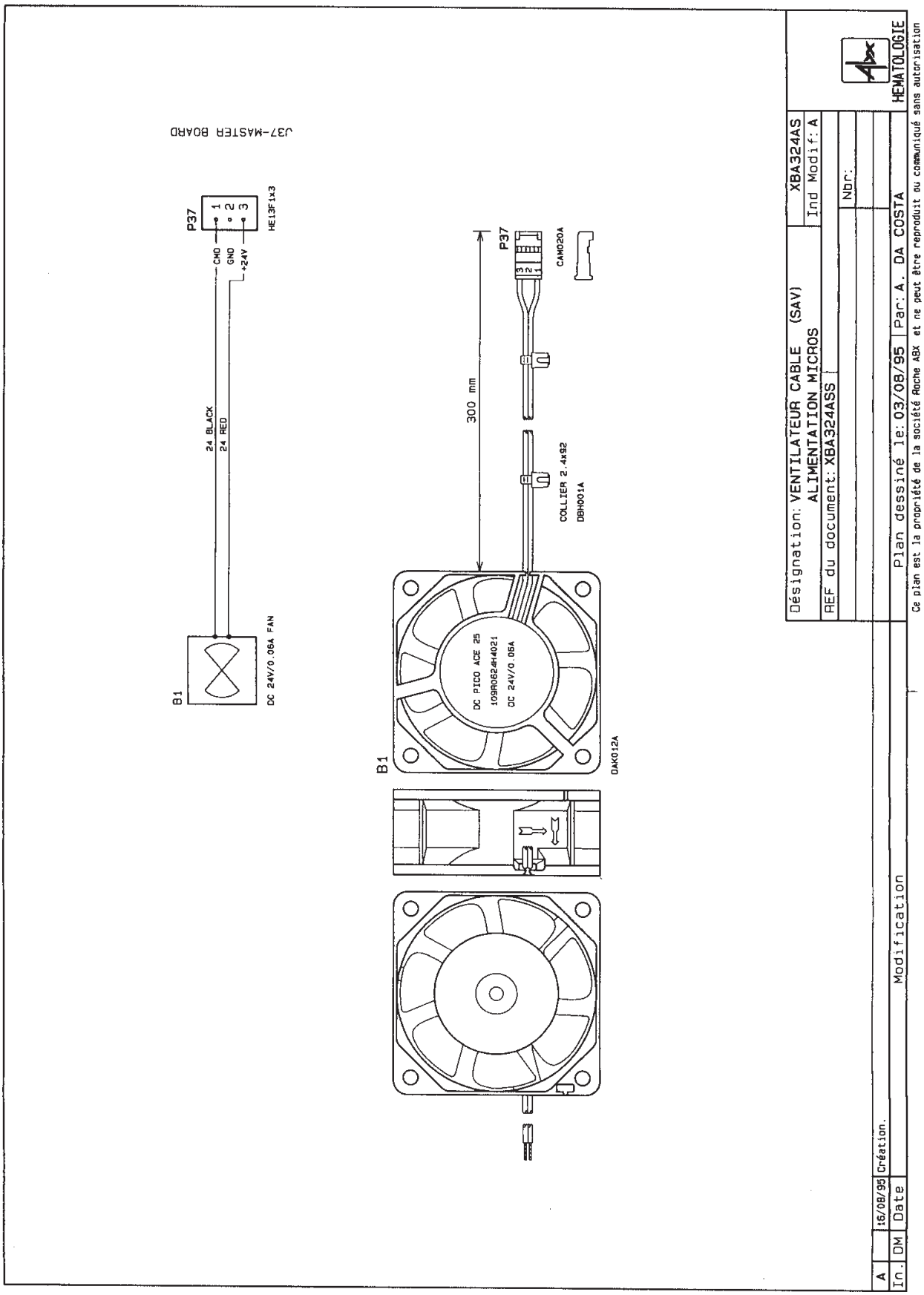
1.1. Principle



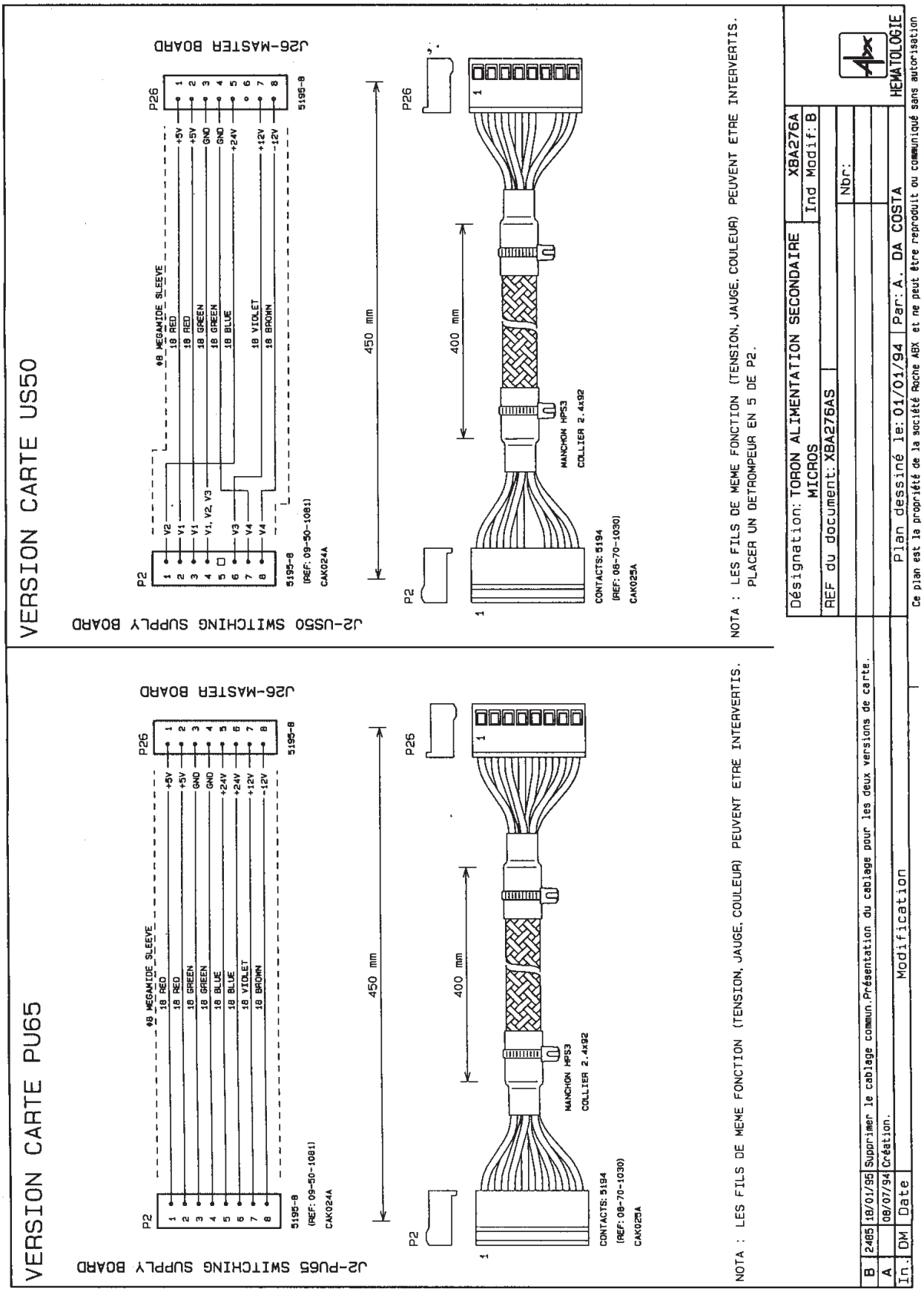
2. ELECTRIC & ELECTRONIC PRINCIPLES



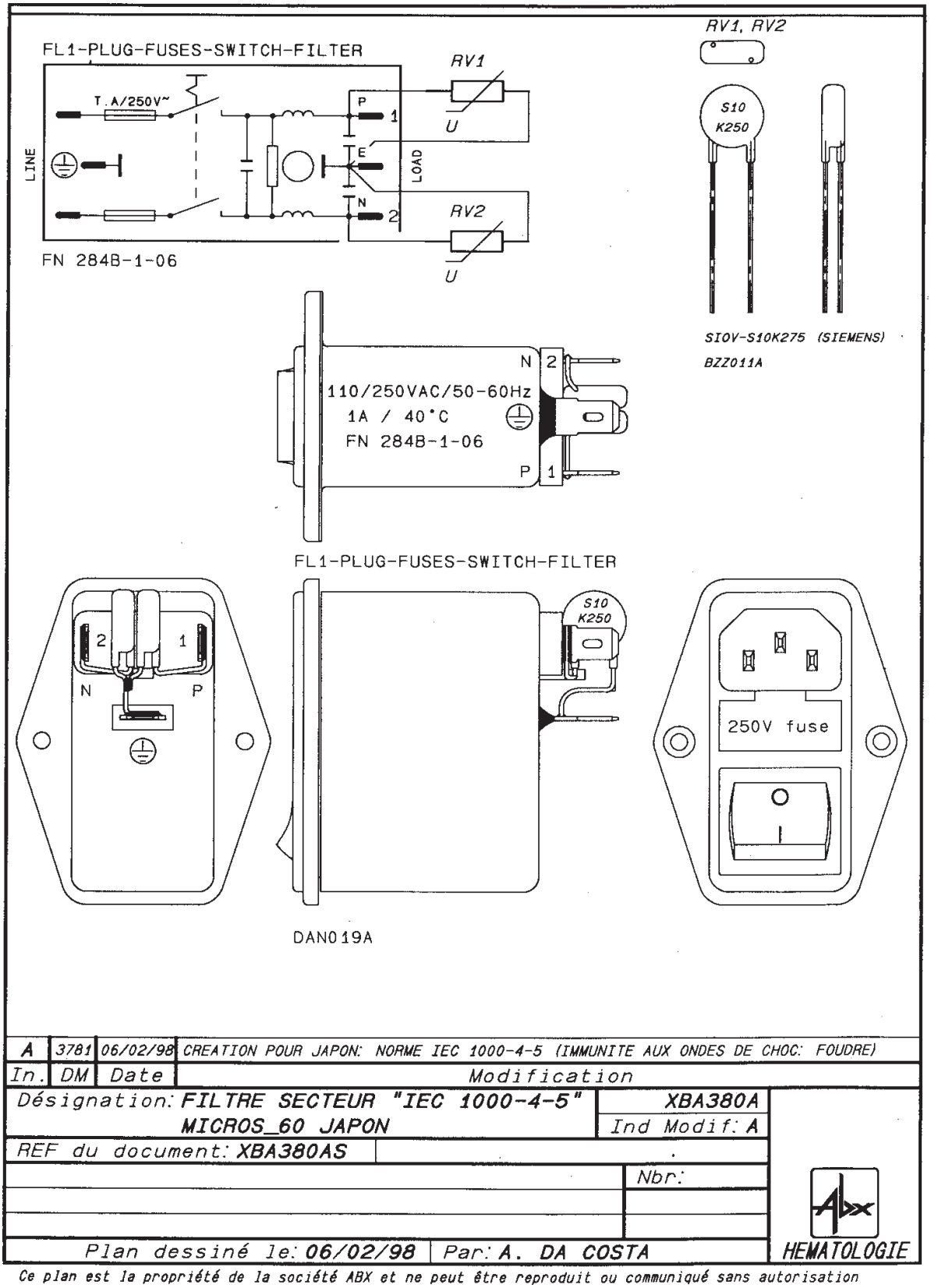
1.2. Power supply fan



1.3. Secondary supply cable



1.4. Main supply filter



A	3781	06/02/98	CREATION POUR JAPON: NORME IEC 1000-4-5 (IMMUNITE AUX ONDES DE CHOC: FOUDRE)
In.	DM	Date	Modification

Désignation: FILTRE SECTEUR "IEC 1000-4-5" MICROS_60 JAPON	XBA380A
	Ind Modif: A
REF du document: XBA380AS	
	Nbr:
Plan dessiné le: 06/02/98	Par: A. DA COSTA

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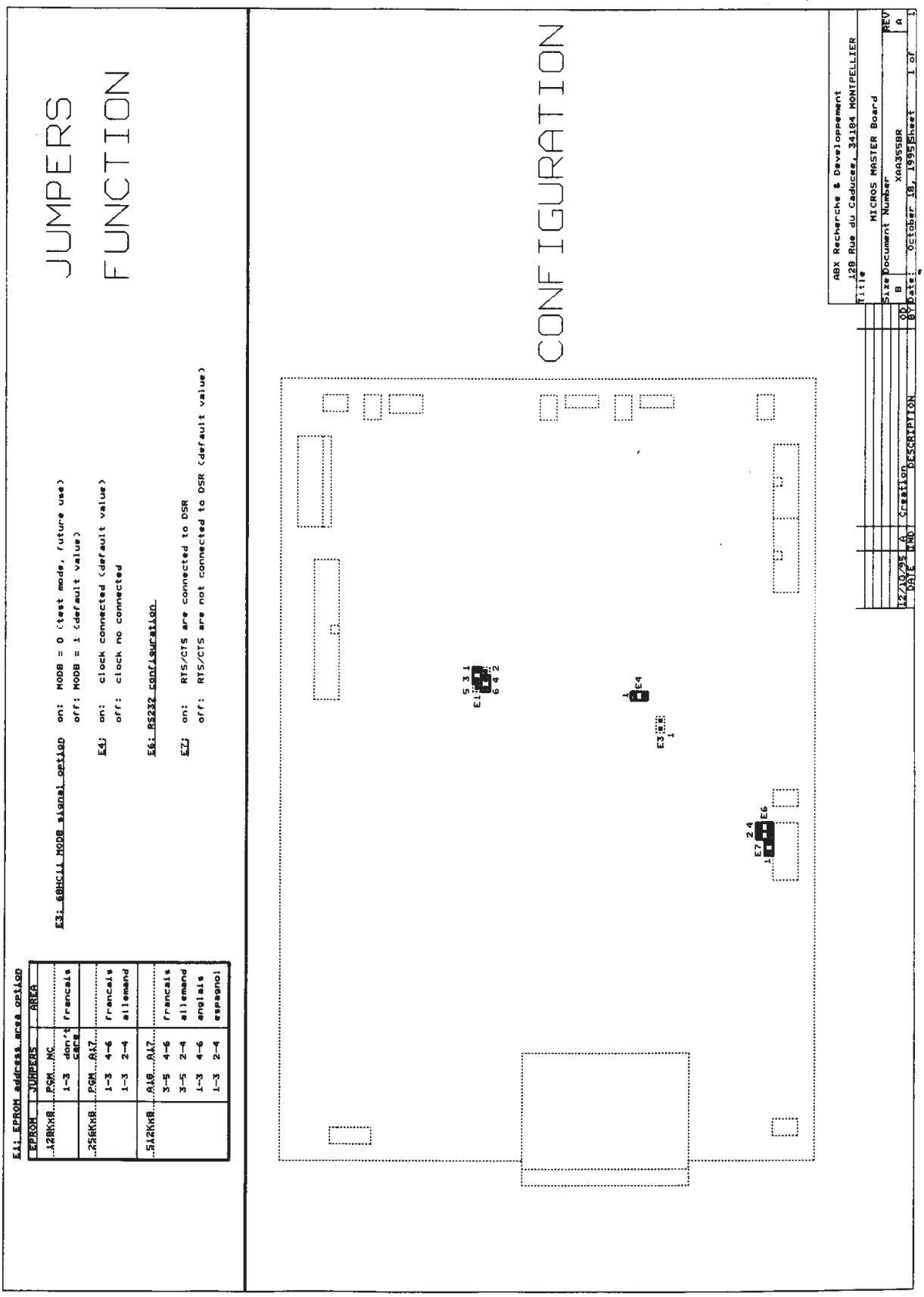
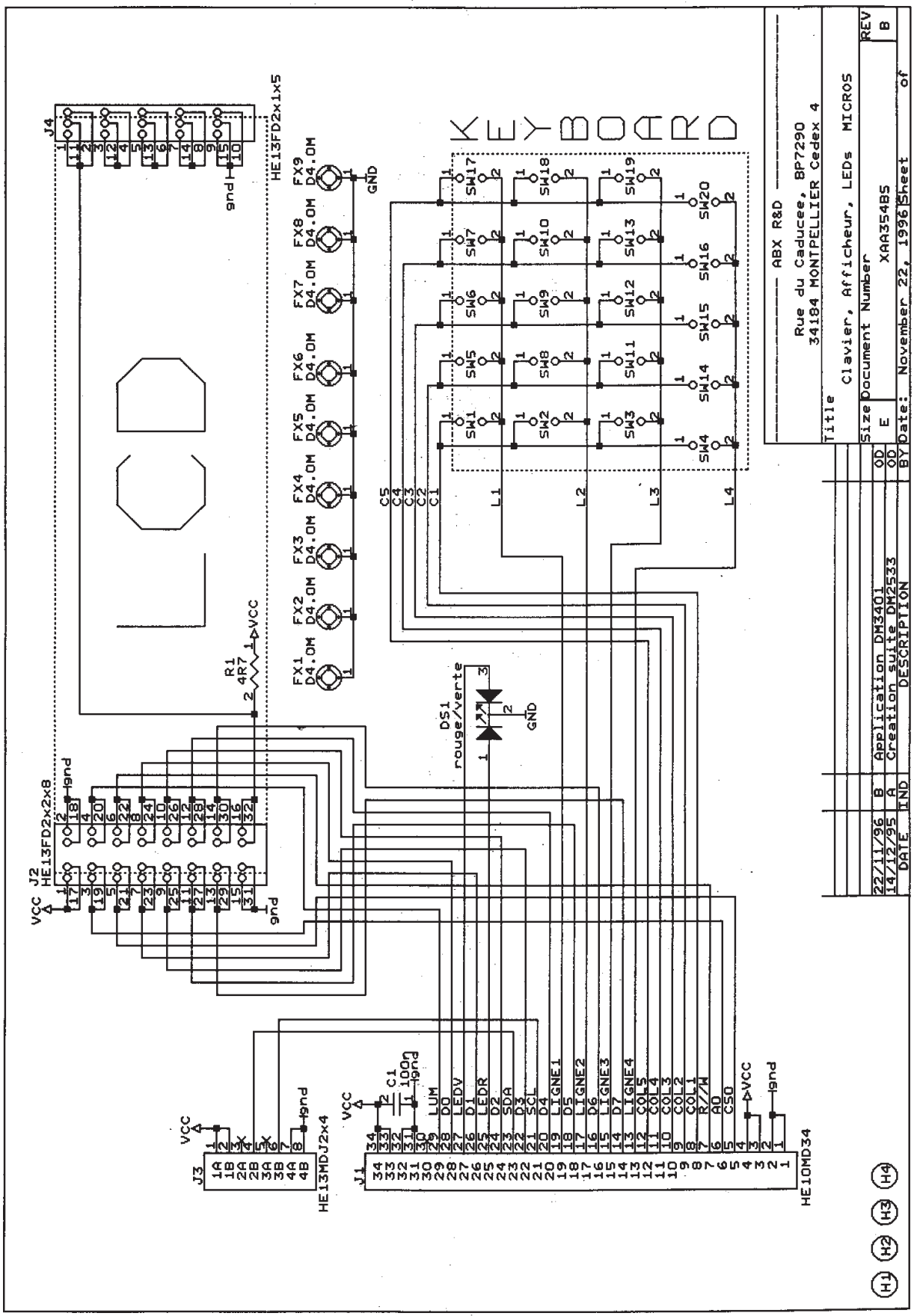
2. MOTHER BOARD

2.1. Configuration



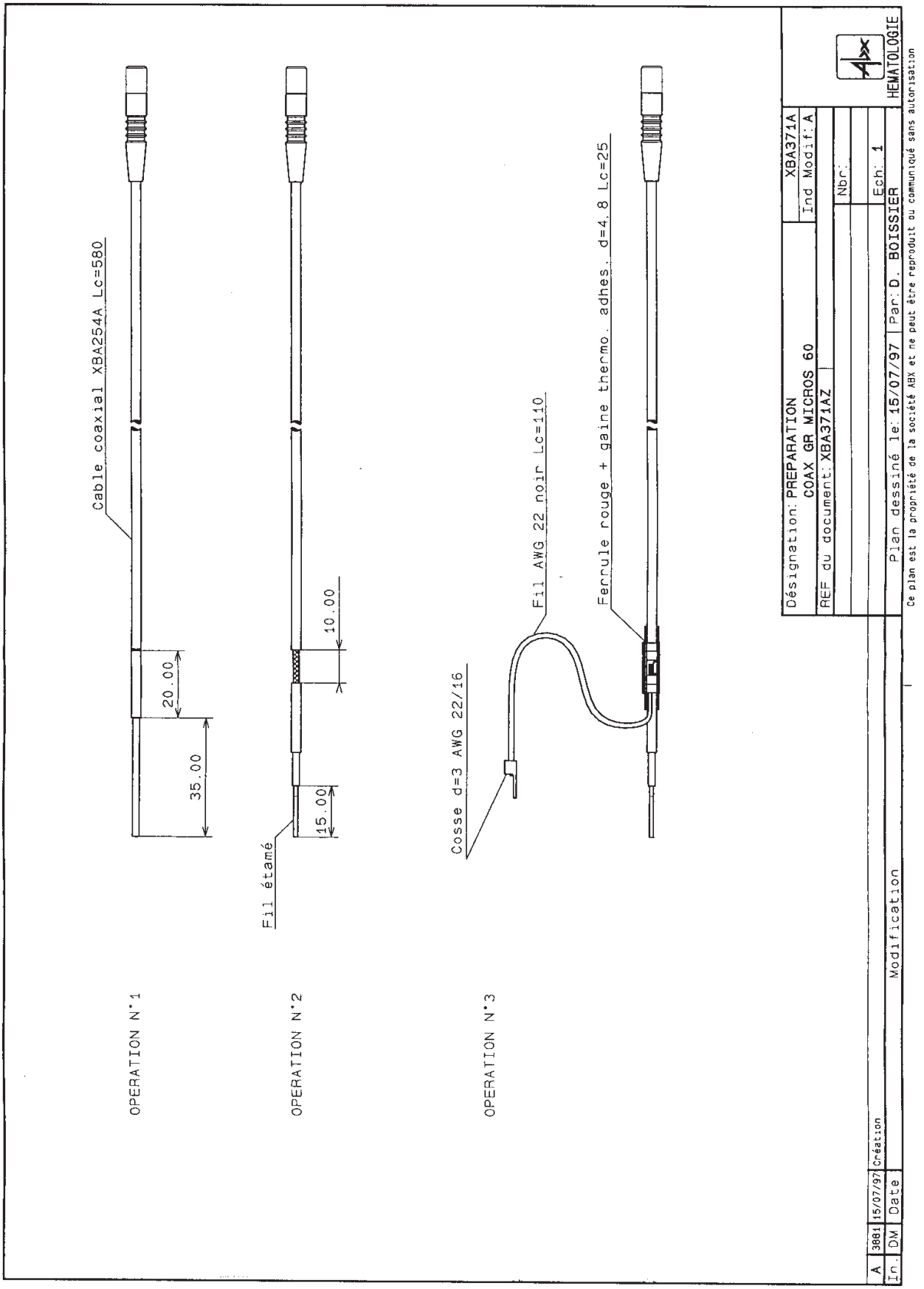
EPROM	JUMPERS	AREA
128Kx8	PGM NC	
	1-3 don't care	francais
256Kx8	PGM A17	
	1-3 4-6	francais
	1-3 2-4	allemand
512Kx8	A18 A17	
	3-5 4-6	francais
	3-5 2-4	allemand
	1-3 4-6	anglais
	1-3 2-4	espagnol

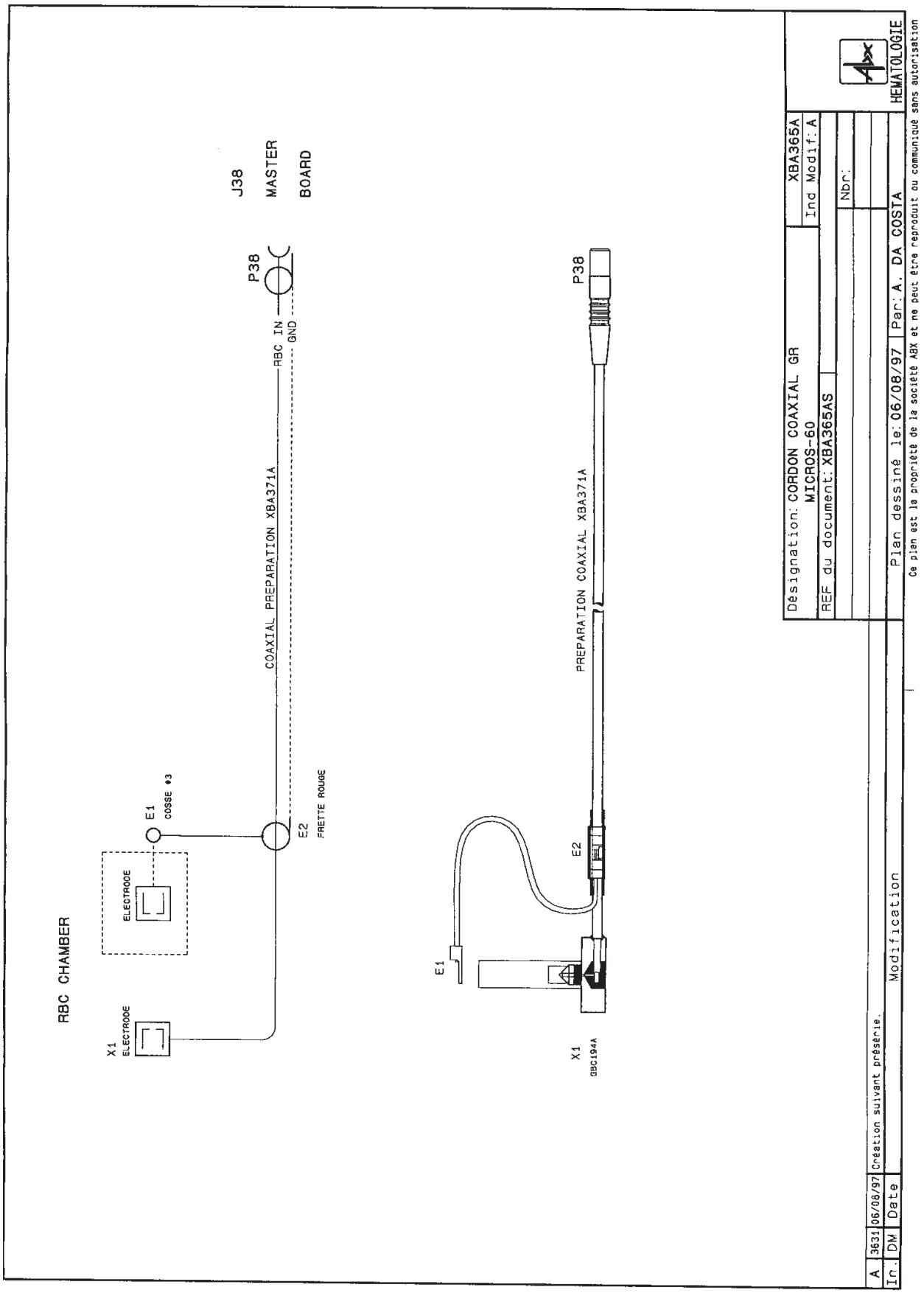
3. LCD BOARD


LCD
KEYBOARD
ABX R&D
Rue du Caducee, BP7290
34184 MONTPELLIER Cedex 4
Title
Clavier, Afficheur, LEDs MICROS
Size
Document Number
XAA3548S
REV
B
Date: November 22, 1996
Sheet
of
Application DM3401
Creation suite DM2533
DESCRIPTION
J4
HE13FD2x1x5
J2
HE13FD2x2x8
J3
HE13MDJ2x4
J1
HE10MD34
R1
4R7
DS1
rouge/verte
C1
100n
C2
C3
C4
C5
L1
L2
L3
L4
VCC
gnd
GND
H1
H2
H3
H4

4. COAXIALS

4.1. RBC coaxial




J38
MASTER
BOARD
P38
RBC IN
GND
COAXIAL PREPARATION XBA371A
E1
COSSE ø3
E2
FRETTE ROUGE
ELECTRODE
X1
ELECTRODE
RBC CHAMBER
P38
PREPARATION COAXIAL XBA371A
E2
E1
X1
08C194A
Désignation: CORDON COAXIAL GR
MICROS-60
REF du document: XBA365AS
XBA365A
Ind Modif: A
Nbr:
Plan dessiné le: 06/08/97
Par: A. DA COSTA
HEMATOLOGIE
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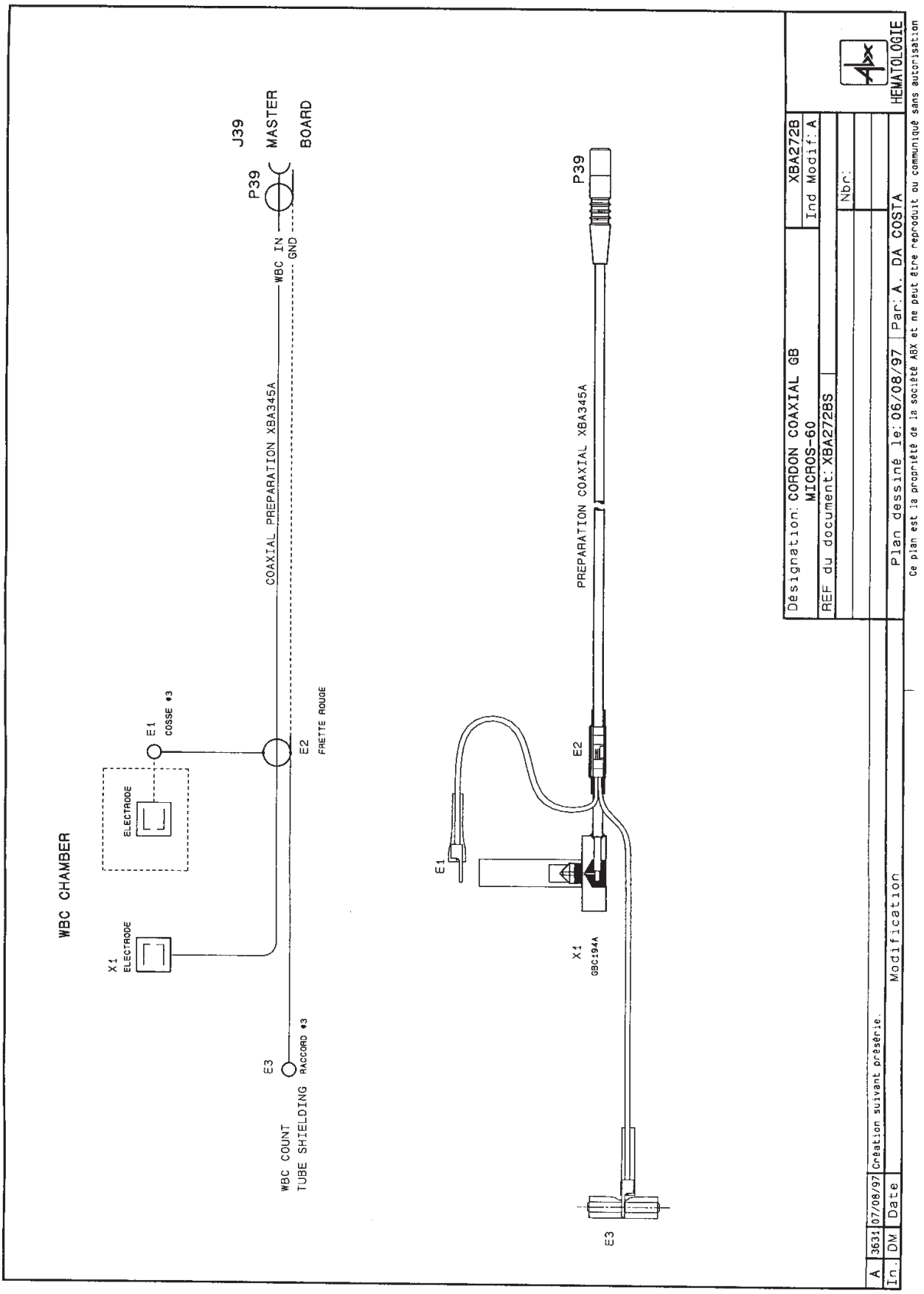
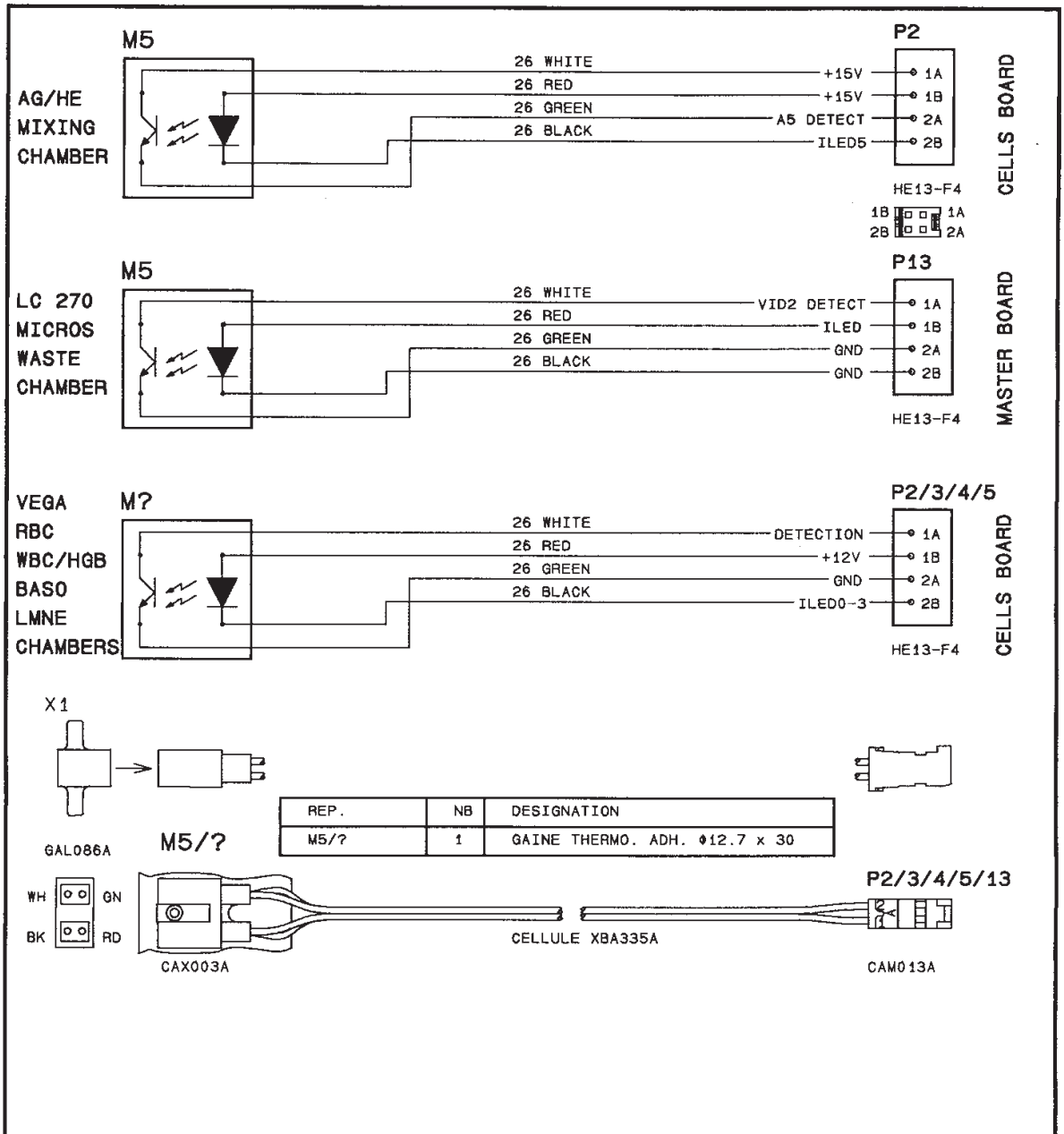
A
3631
06/08/97
Création suivant préserie.
In.
DM
Date
Modification

4.2. WBC coaxial



5. SENSORS

5.1. Drain detection sensor



In.	DM	Date	Modification
C	3745	01/04/98	SECONDE SOURCE CELLULE IR VALIDEE. APPLICATION SUR LC 270.
B	2638	05/05/95	Réaliser à partir de la cellule, sous-traitée, XBA335A.
A		26/07/90	Creation.

Désignation: CELLULE MIX AG/HE; DECHETS MS/ LC270; GR-GB/HB-BASO-LMNE VEGA — XBA199A — Ind Modif: C

REF du document: XBA199AS

Nbr:

Plan dessiné le: 09/09/92 | Par: A. DA COSTA

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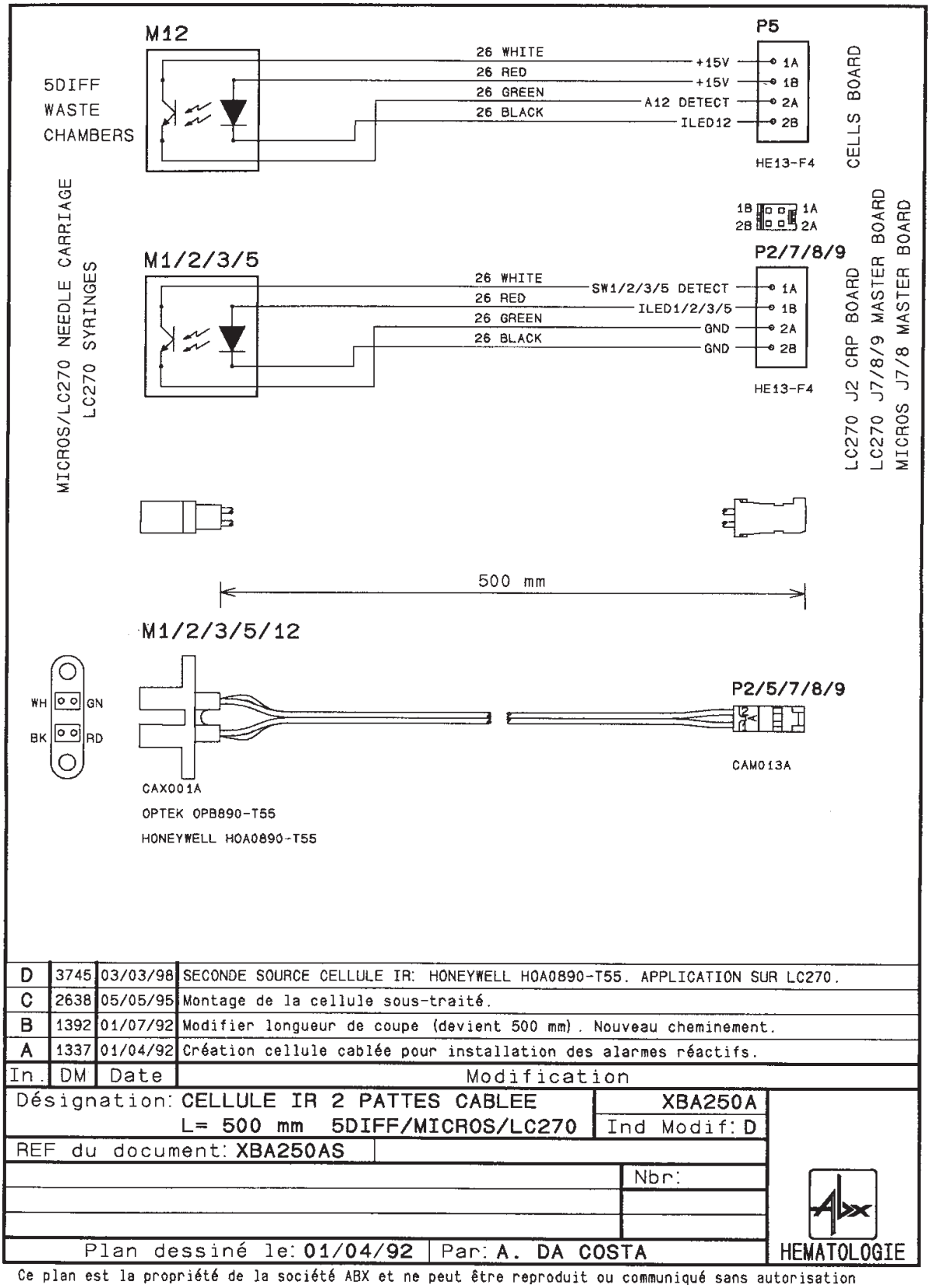
5.2. Carriage & needle sensors



In.	DM	Date	Modification
D	3745	03/03/98	SECONDE SOURCE CELLULE IR: HONEYWELL HOA0890-T55. APPLICATION SUR LC270.
C	2638	05/05/95	Montage de la cellule sous-traité.
B	1392	01/07/92	Modifier longueur de coupe (devient 500 mm). Nouveau cheminement.
A	1337	01/04/92	Création cellule cablée pour installation des alarmes réactifs.

Désignation: CELLULE IR 2 PATTES CABLEE L= 500 mm 5DIFF/MICROS/LC270 — XBA250A — Ind Modif: D

REF du document: XBA250AS

Nbr:

Plan dessiné le: 01/04/92 — Par: A. DA COSTA

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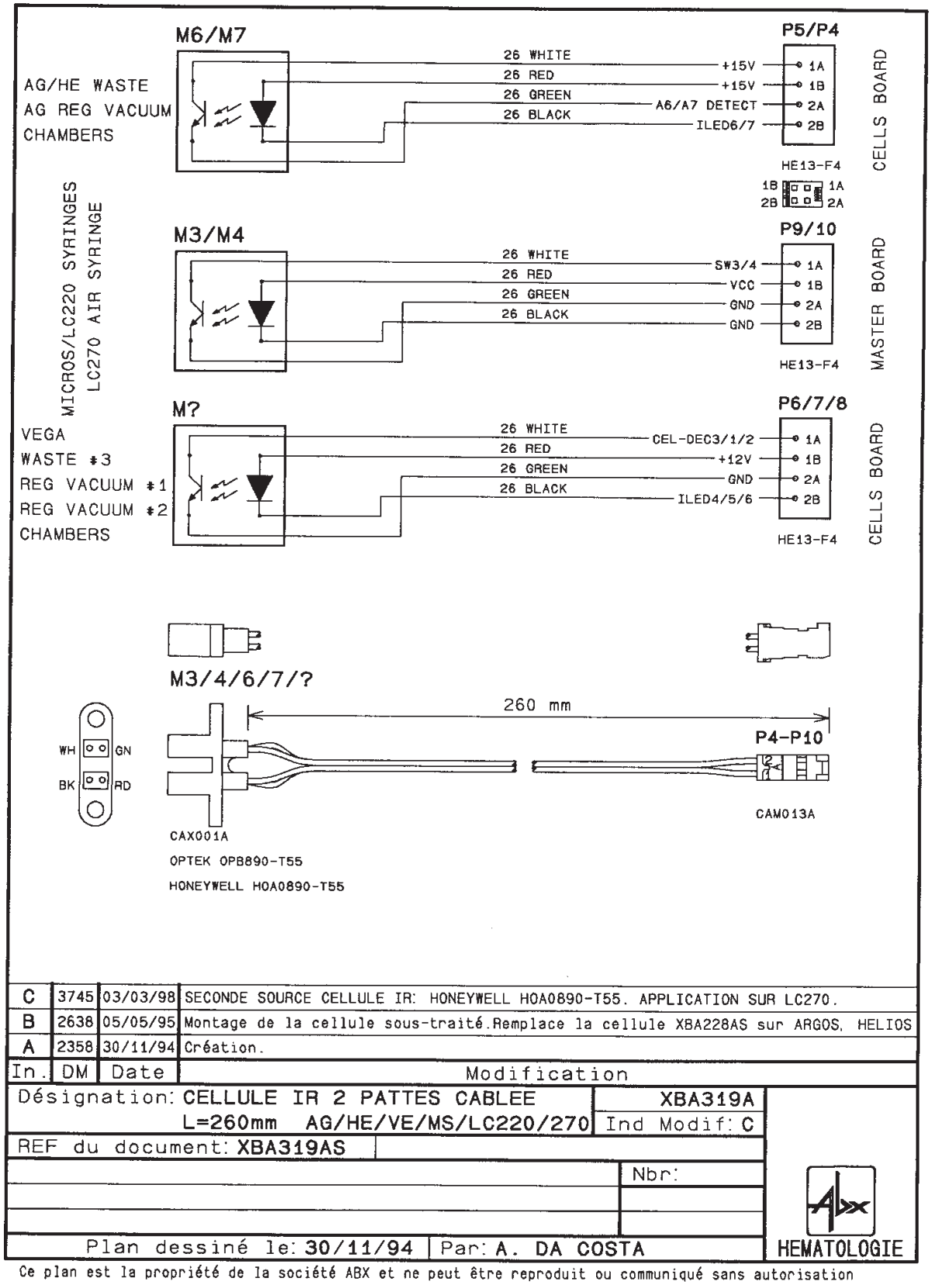
5.3. Syringe sensors



In.	DM	Date	Modification
C	3745	03/03/98	SECONDE SOURCE CELLULE IR: HONEYWELL HOA0890-T55. APPLICATION SUR LC270.
B	2638	05/05/95	Montage de la cellule sous-traité.Remplace la cellule XBA228AS sur ARGOS, HELIOS
A	2358	30/11/94	Création.

Désignation: CELLULE IR 2 PATTES CABLEE L=260mm AG/HE/VE/MS/LC220/270 — XBA319A — Ind Modif: C

REF du document: XBA319AS

Nbr:

Plan dessiné le: 30/11/94 — Par: A. DA COSTA

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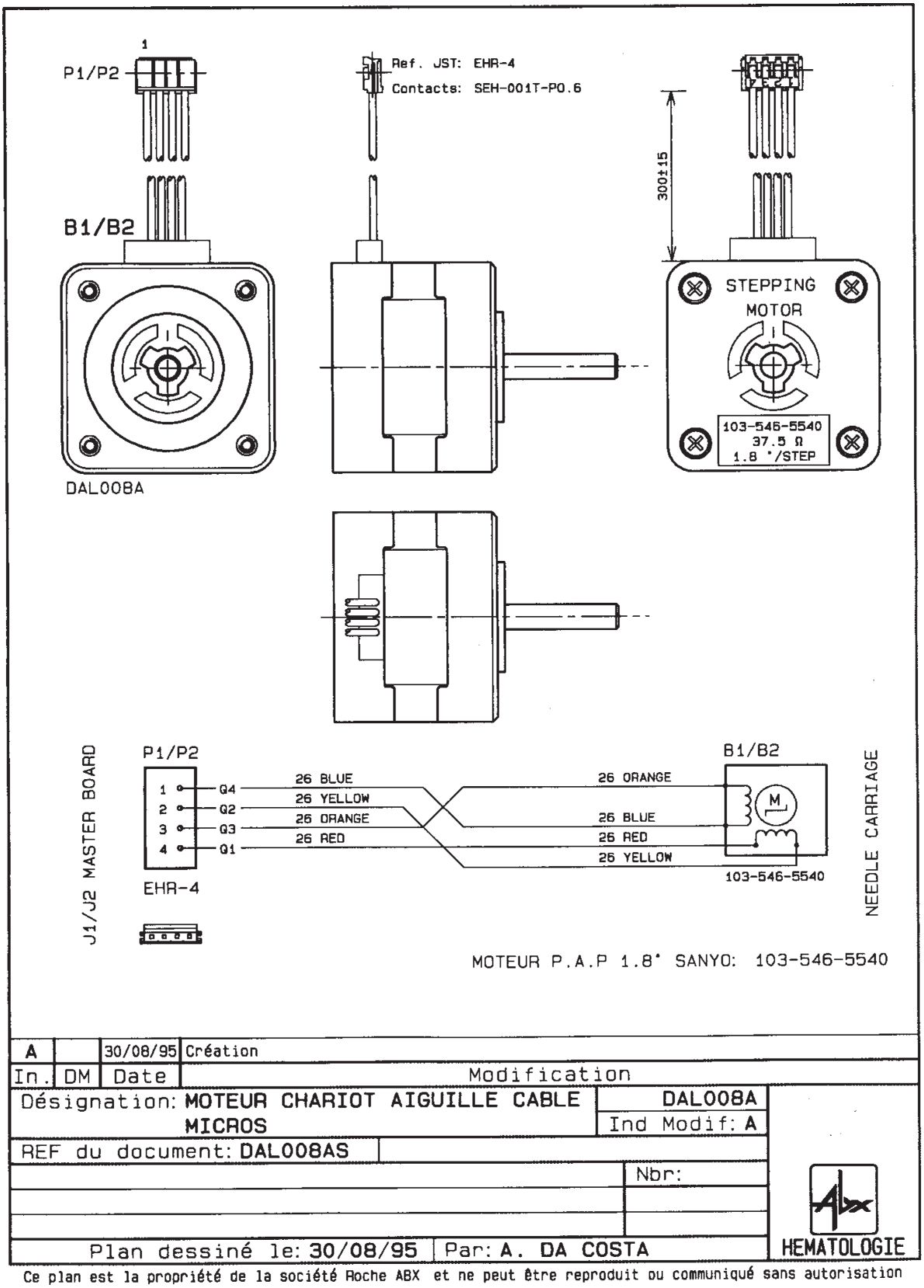
6. MISCELLANEOUS

6.1. Needle carriage motor



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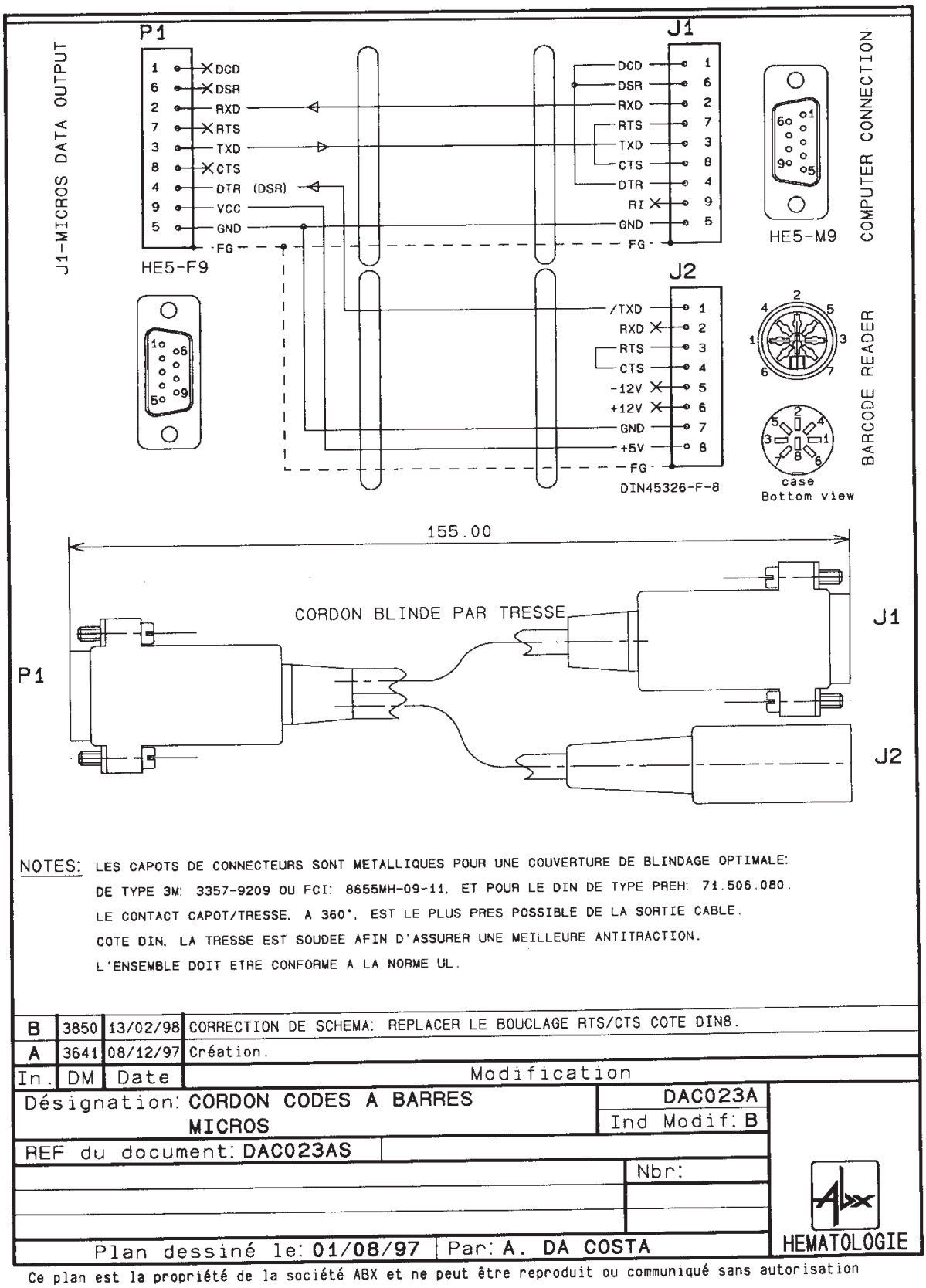
6.2. Barcode cable



NOTES: LES CAPOTS DE CONNECTEURS SONT METALLIQUES POUR UNE COUVERTURE DE BLINDAGE OPTIMALE:
DE TYPE 3M: 3357-9209 OU FCI: 8655MH-09-11, ET POUR LE DIN DE TYPE PREH: 71.506.080.
LE CONTACT CAPOT/TRESSE, A 360°, EST LE PLUS PRES POSSIBLE DE LA SORTIE CABLE.
COTE DIN, LA TRESSE EST SOUDEE AFIN D'ASSURER UNE MEILLEURE ANTITRACTION.
L'ENSEMBLE DOIT ETRE CONFORME A LA NORME UL.

In.	DM	Date	Modification
B	3850	13/02/98	CORRECTION DE SCHEMA: REPLACER LE BOUCLAGE RTS/CTS COTE DIN8.
A	3641	08/12/97	Création.

Désignation: CORDON CODES A BARRES MICROS
DAC023A
Ind Modif: B
REF du document: DAC023AS
Nbr:
Plan dessiné le: 01/08/97 Par: A. DA COSTA
HEMATOLOGIE

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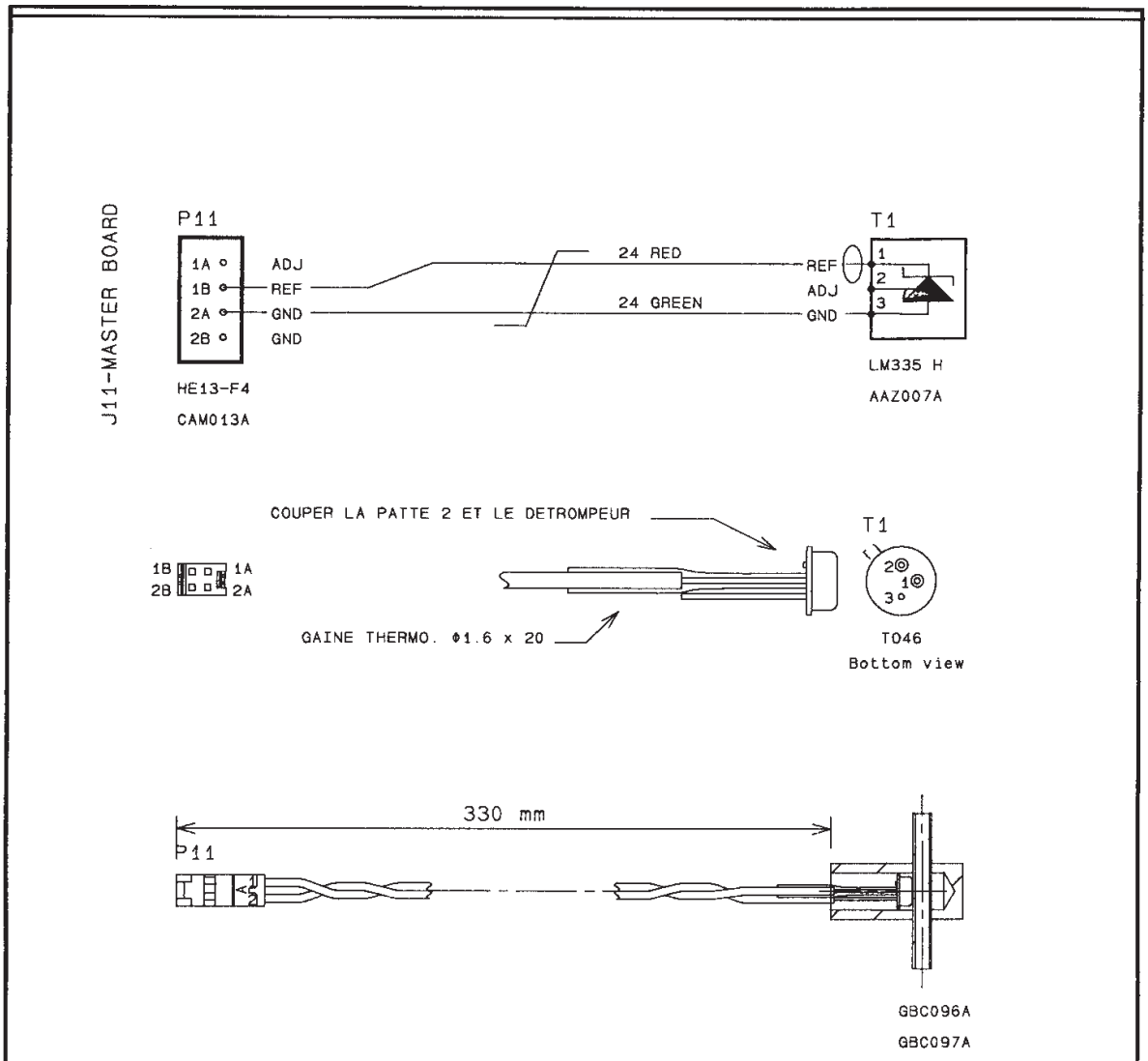
6.3. Temperature sensor



NOTA: LONGUEUR DE COUPE DES FILS: 360 mm

In.	DM	Date	Modification
D	3627	05/08/97	Rallonger le câble de 50 mm, pour compatibilité entre MICROS, LC220 et LC-CRP.
C	3185	30/12/96	Supprimer la liaison "ADJ", fils gris: Couper la patte 2 et supprimer 2 gaines.
B	2533	19/10/95	Passage à la norme CE: Torsader les fils
A		02/06/94	Création.

Désignation: CAPTEUR DE TEMPERATURE CABLE MICROS / LC220 / LC-CRP — XBA281A — Ind Modif: D

REF du document: XBA281AS

Nbr:

Plan dessiné le: 02/06/94 | Par: A. DA COSTA

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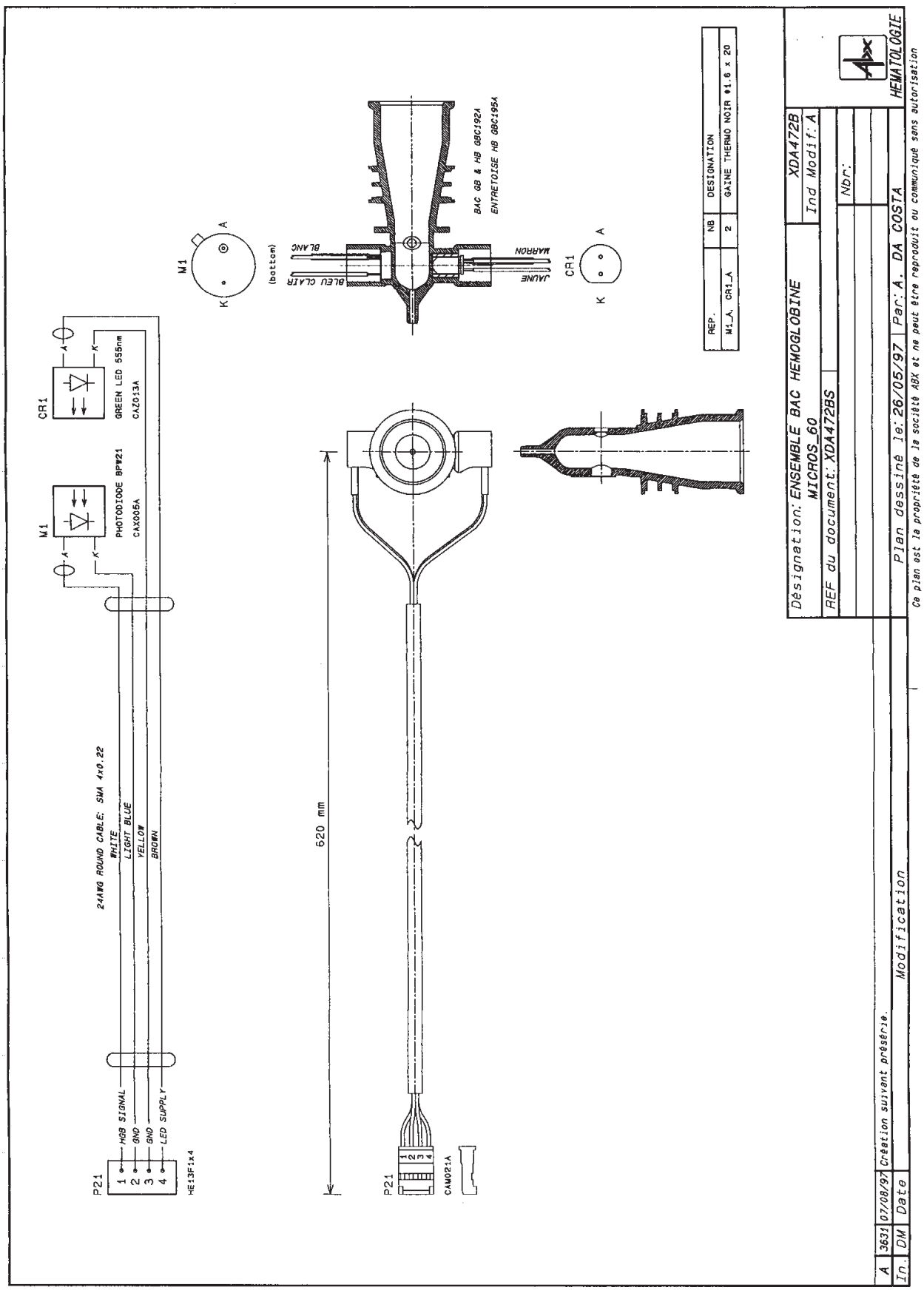
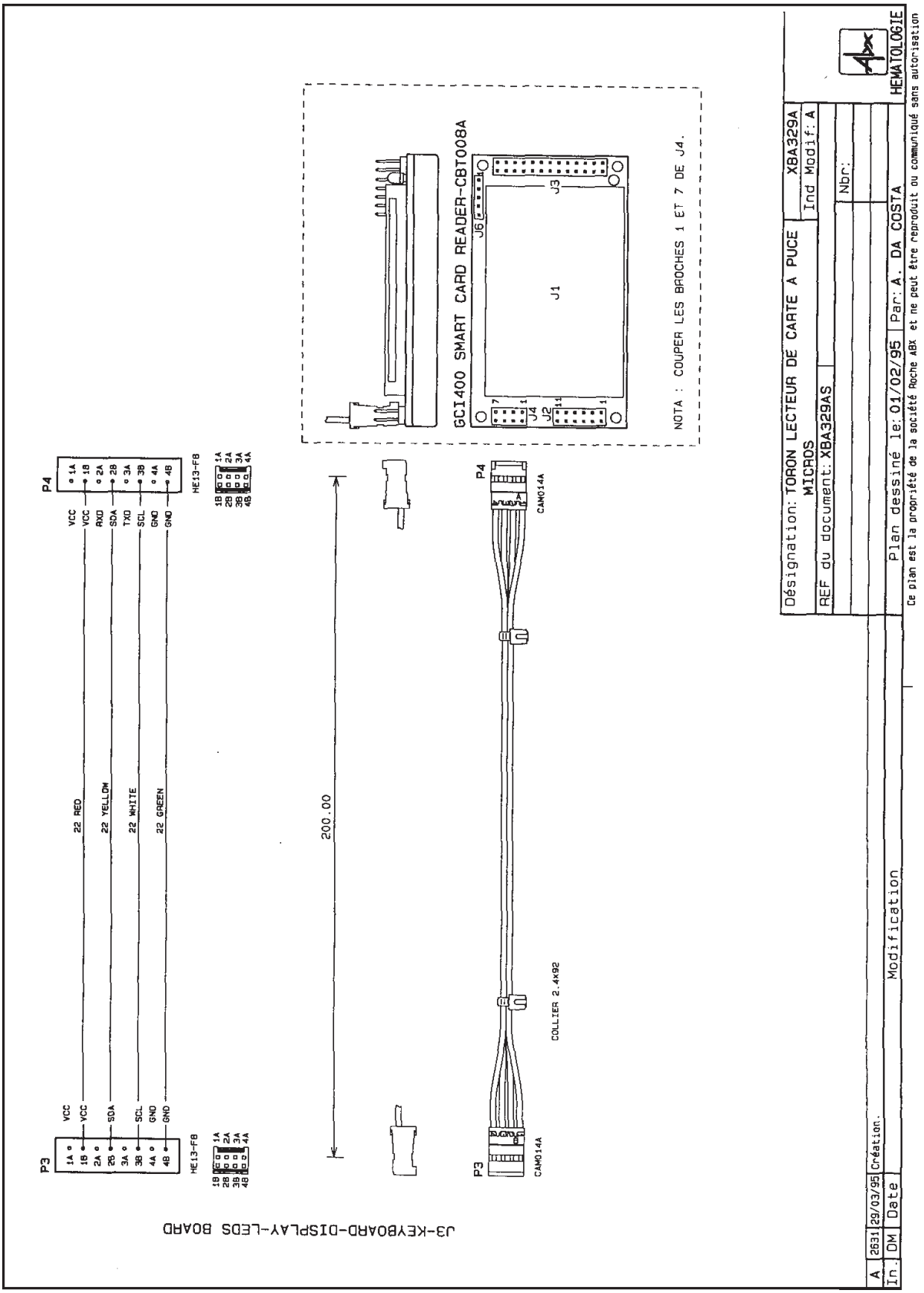
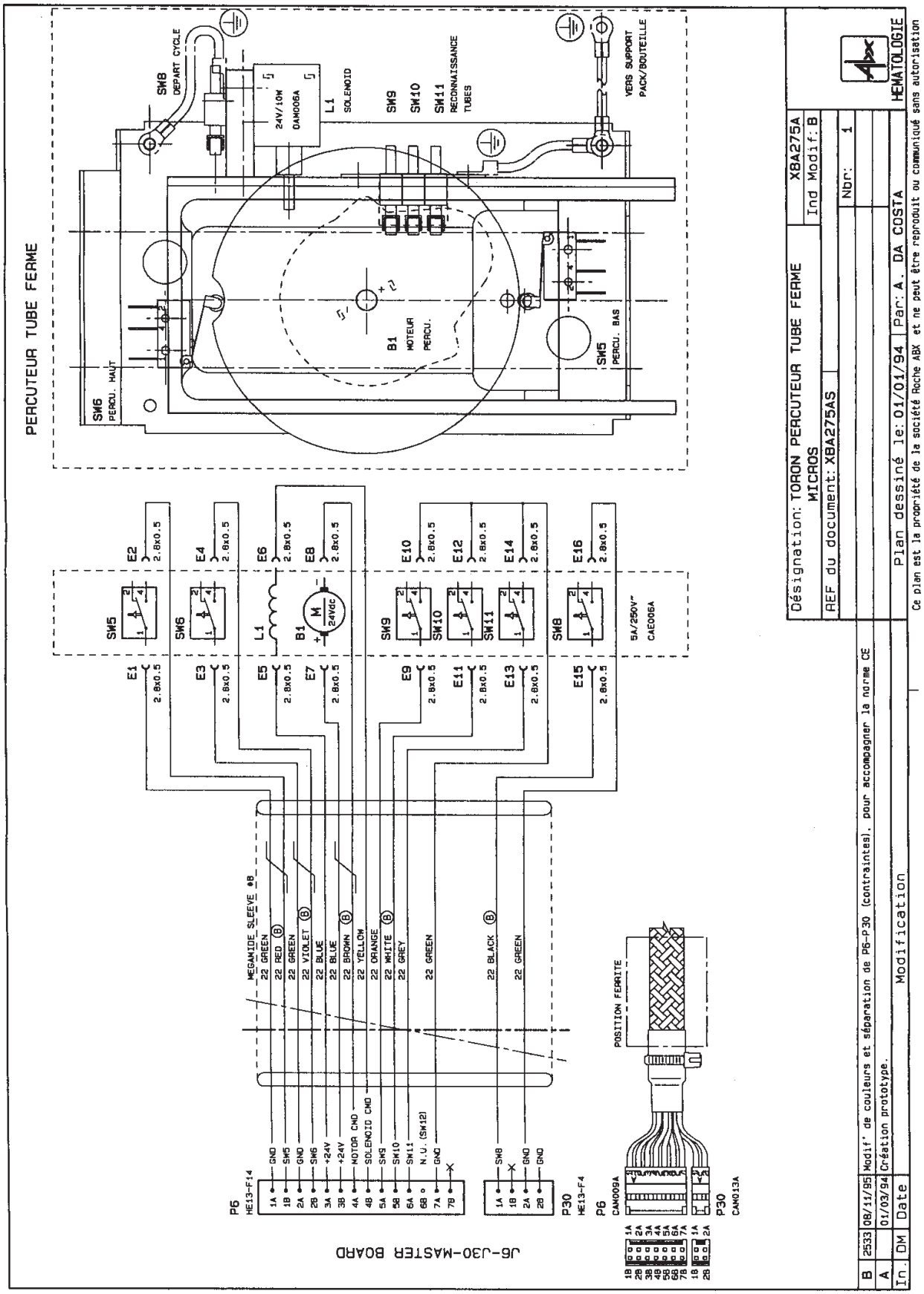
6.4. HGB Chamber assembly



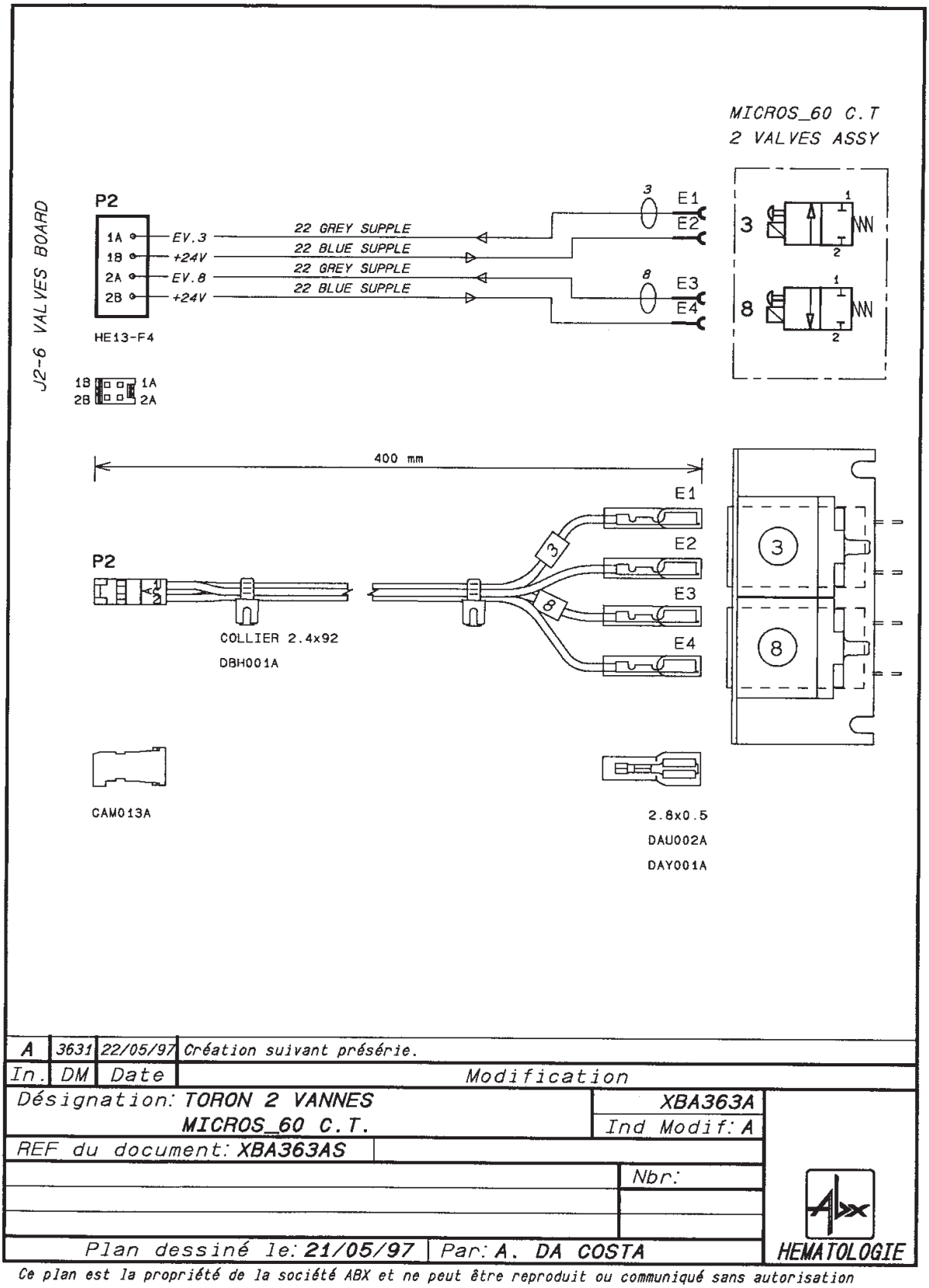
6.5. Chip card reader cable



6.6. CT Piercing assembly cable



6.7. CT twin valve cable



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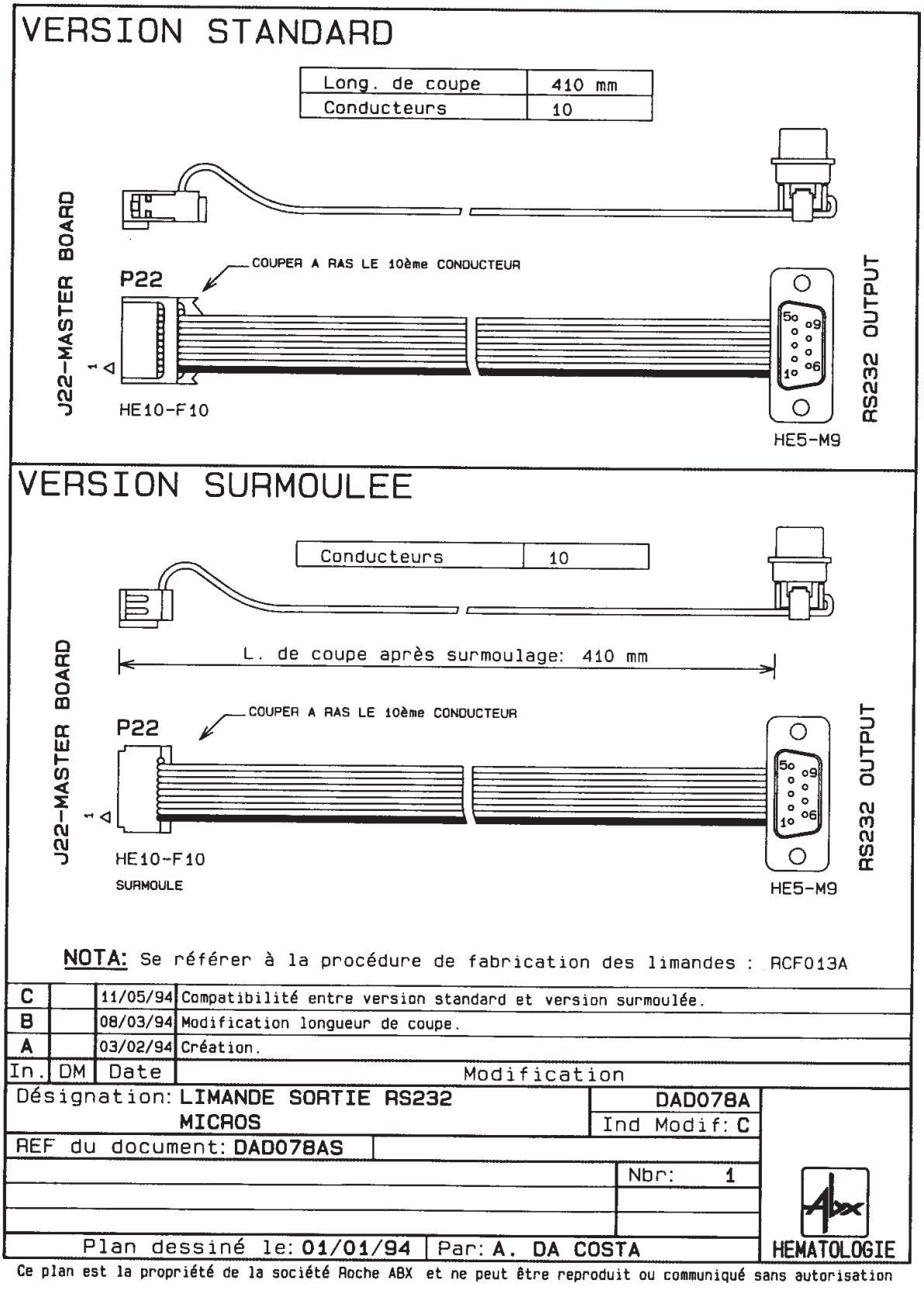
7. FLAT CABLES



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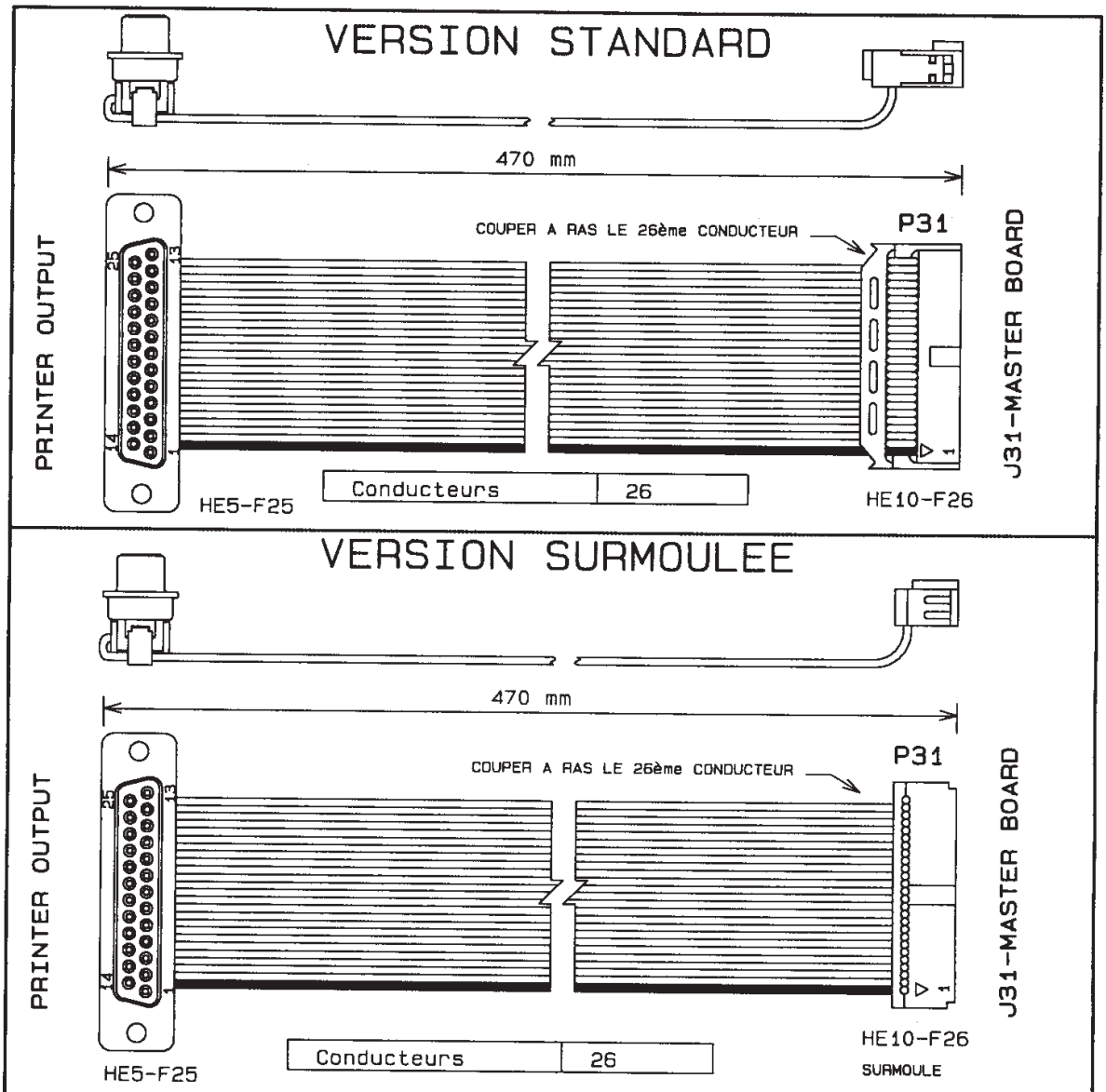

NOTA: Se référer à la procédure de fabrication des limandes : RCF013A

In.	DM	Date	Modification
D	2533	25/10/95	Normes CE: Allonger la limande (pour montage d'une ferrite)
C		11/05/94	Compatibilité entre version standard et version surmoulée.
B		08/03/94	Modification longueur de coupe.
A		03/02/94	Création.

Désignation: LIMANDE SORTIE IMPRIMANTE MICROS — DAD079A — Ind Modif: D

REF du document: DAD079AS — Nbr: 1

Plan dessiné le: 01/01/94 — Par: A. DA COSTA — HEMATOLOGIE

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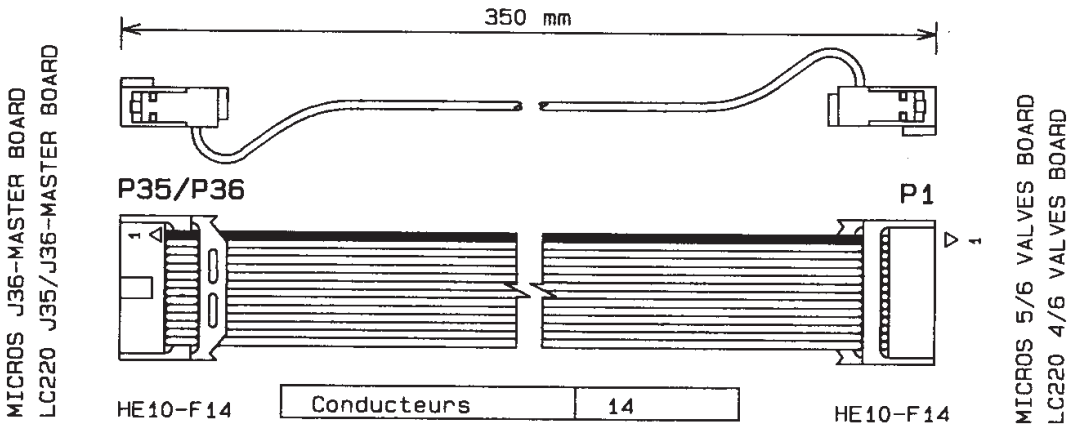
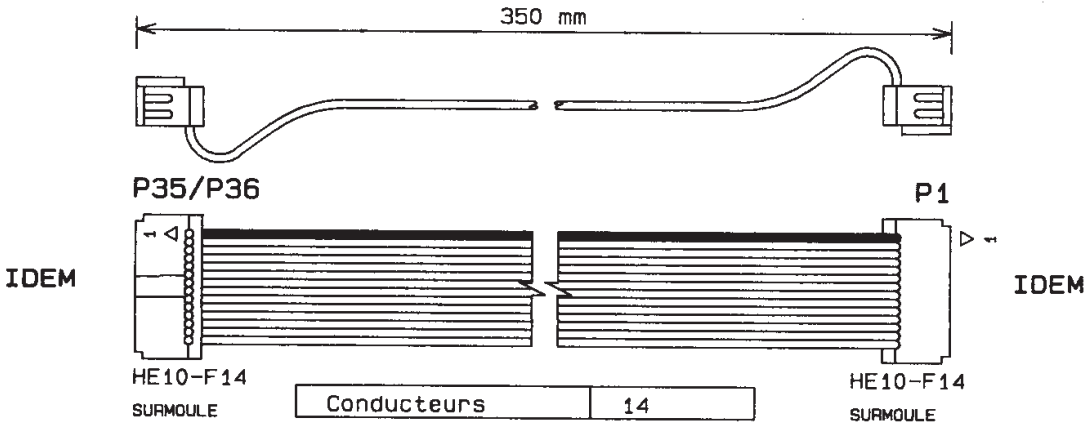
VERSION STANDARD



VERSION SURMOULEE



NOTA: Se référer à la procédure de fabrication des limandes : RCF013A

In.	DM	Date	Modification
C	2584	14/04/95	Rallonger la limande de 30 mm, pour une utilisation commune sur MICROS et LC220
B		11/05/94	Compatibilité entre version standard et version surmoulée.
A		03/02/94	Création.

Désignation: LIMANDE 5/6 ELECTROVANN MICROS 4/6 ELECTROVANNES LC220 — DAD075A — Ind Modif: C

REF du document: DAD075AS

Nbr:

Plan dessiné le: 01/01/94 — Par: A. DA COSTA

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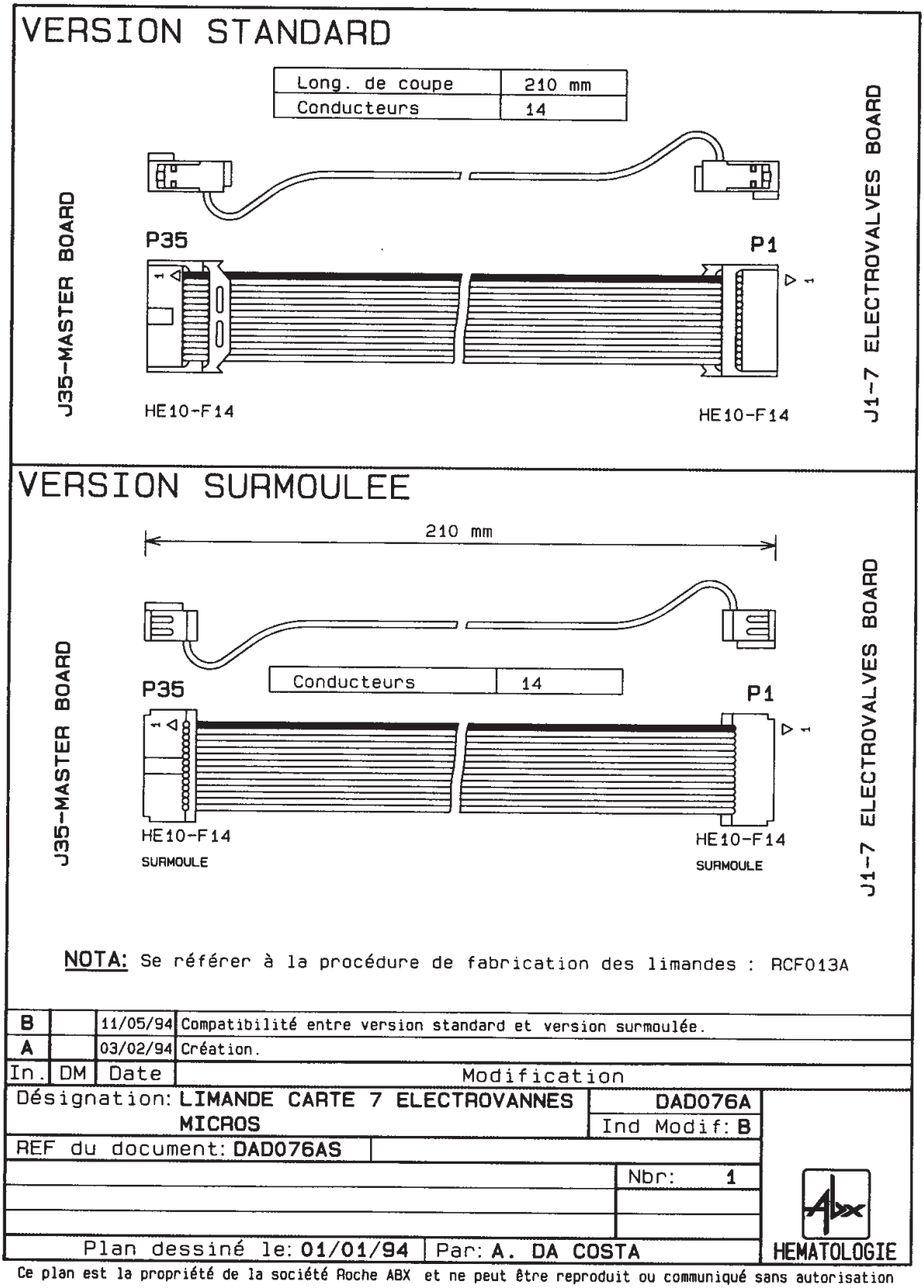

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8. ELECTRICAL SYNOPTICS

CONTENTS

1. MAINTENANCE 2

1.1. Introduction 2
1.2. Daily customer maintenance 2
1.3. Weekly customer maintenance 2

2. Maintenance kits 3

3. PROCEDURES 4

3.1. Procedure chart tables 5
3.2. Required tools and products 7

1. MAINTENANCE

1.1. Introduction

WARNING !

Customer maintenance has to be carried out according to the recommended frequency chart table and after having performed an ABX approved customer training course.
The system warranty may be affected if damage occurs after a non trained technician intervenes or if replaced spare parts and consumables do not come from an ABX approved origin.

1.2. Daily customer maintenance

No special adjustments or maintenance has to be done on your equipment if the recommended startup and shutdown procedures are explicitly respected.
See the ***ABX MICROS 60*** User Manual for the daily rinsing and cleaning of the system.

1.3. Weekly customer maintenance

An overall check for cleanliness of the system is recommended every week.
All traces of blood or reagent have to be wiped off as soon as possible using a piece of cloth and distilled water.

CAUTION

Never use solvent or abrasive cleaning material to clean the system.

2. MAINTENANCE KITS

O RING KIT : XEA 328 AS	
FAA 036 A	1 Lyse dispenser O ring 1 Piercing needle O ring (MICROS CT only)
FAA 029 A	1 Diluent dispenser O ring
FAA 055 A	2 Sampling syringe O rings
FAA 049 A	2 Aperture O rings
FAA 046 A	2 Coaxial O rings
FAA 054 A	2 Sampling needle O rings (CT)
FAA 053 A	1 Sampling needle O ring (OT)
FAA 017 A	1 Vacuum/waste syringe O ring
KAM 022 A	6 Board holder clips (MICROS 45 only)
FAA 023 A	1 WBC/HGB chamber cap O ring
GBC 030 A	1 Air Syringe piston

Part number	SPARE PARTS KIT XEA 458 AS	Quantity
CAE 006 A	tube holder detection switch	1
EAE 005 A	Tygon tube 1.02mm (0,040")	2
EAE 007 A	Tygon tube 1,52mm (0,060")	2
EAE 008 A	Tygon tube 2,05mm (0,081")	2
EAE 009 A	Tygon tube 2,29mm (0,090")	2
FAK 001 A	Aperture 50µ	1
FAK 003 A	Aperture 80µ	1
FBR 002 A	Notched belt 290	1
FBR 003 A	Notched belt 380	1
GBC 052 A	C.T sampling needle	1
GBC 069 A	O.T sampling needle	1
GBC 189 A	CT Piercing needle	1
GBC 193 A	RBC chamber	1
XBA 199 A	Drain detection sensor	1
XBA 250 A	Carriage/needle sensor	1
XBA 272 B	WBC coaxial	1
XDA 472 B	WBC/HGB chamber	1
XDA 481 B	Liquid valve 2W NC without solenoid	1
XDA 483 B	Liquid valve 3W without solenoid	1
XBA 365 A	RBC coaxial	1
XBA 319 A	Liquid/air syringe sensor	1
XEA 328 AS	Maintenance kit	1

3. PROCEDURES

NOTE Maintenance and adjustments that need to be done on ***ABX MICROS 60*** are divided into «procedures» according to concerned assemblies. This should make any updating easier as all interventions can be done with the corresponding «procedure» on its own.

CONCERNING PARTS :

- Hydraulic maintenance and adjustments.
- Pneumatic maintenance and adjustments.
- Electrical maintenance and adjustments.
- Power supply maintenance and adjustments.
- Electronic maintenance and adjustments.
- Printer maintenance and setup.

NOTE Each procedure has to be read entirely before beginning the intervention.

WARNING !

When cleaning instruments, disposable gloves should be worn.

3.1. Procedure chart tables

MICROS 60 OT		
P/N	PROCEDURE	CONCERNS
RAS 165 A	**MICROS 60 OT** INSTALLATION AND STARTUP	Unpacking - Working conditions - Visual checks - Reagent connection - Printer & instrument connections - Priming & Startup
RAS 168 A	SAMPLING NEEDLE MAINTENANCE **MICROS OT**	Needle replacement - O ring replacement
RAS 169 A	CHAMBER MAINTENANCE	RBC, WBC/HGB chamber cleaning - Aperture O ring replacement - Coaxial O ring replacement
RAS 170 A	LIQUID VALVE MAINTENANCE	Liquid valve assy replacement - Valve body replacement
RAS 171 A	POWER SUPPLY CHECK/REPLACEMENT	Voltage supply check - Power supply module replacement Fan operation check.
RAS 172 A	TECHNICIAN FUNCTIONS **MICROS 60 OT**	Version display. - Adjustments : HGB photometer calibration, Aperture voltage, pressure check, WBC gain , RBC & PLT gain, Sensor, Needle heigth and motion, bubbling. - Temperature sensor adjustment - Run mode - Reagent pack - Serial number - Cycle number - Burning
RAS 173 A	MECHANIC FUNCTIONS	Sensor replacement - Needle motion check - Carriage motion check - Liquid syringe motion check - Vac/Waste syringe motion check - Valve operation check - LCD contrast - Piercing mechanism check
RAS 174 A	DRAIN DETECTION ADJUSTMENT	Drain detection sensor adjustment
RAS 175 A	PCB VOLTAGE CHECKS	Voltage supply check/adj. - Aperture voltage check/adj. - RBC threshold check/adj. - WBC threshold check/adj. - PLT threshold check/adj. - HGB blank voltage check - Stepper motor voltage adjustment
RAS 177 A	LX300 PRINTER	Configuration - Control panel - Control LEds and keys - Description
RAS 178 A	LIQUID SYRINGE MAINTENANCE	Lyse dispenser O ring replacement - Diluent dispenser O ring replacement - Sampling needle dispenser O ring replact. - Lubrification
RAS 179 A	VACUUM/WASTE SYRINGE MAINTENANCE	O ring replacement
RAS 180 A	CHANGING THE INSTRUMENT LANGUAGE	Changing the instrument language
RAS 181 A	REAGENT PACK	Connector O ring replacement
RAS 182 A	BARCODE READER SETUP	Reader configuration
RAS 187 A	HYDRAULIC CYCLE CHECKUP M**ICROS 60 OT**	Step by step control of the hydraulic cycle
RAS 191 A	OVERALL MAINTENANCE	Instrument maintenance step by step
RAS 192 A	DECONTAMINATION	Instrument decontamination
RAS 197 A	DRAIN & RINSE	Instrument rinse and drain for an extended shutdown

MICROS 60 CT		
P/N	PROCEDURE	CONCERNS
RAS 166 A	**MICROS 60 CT** INSTALLATION AND STARTUP	Unpacking - Working conditions - Visual checks - Reagent connection - Printer & instrument connections - Priming & Startup
RAS 167 A	SAMPLING NEEDLE MAINTENANCE **MICROS CT**	Needle O ring replacement - Sampling needle replacement Piercing needle replacement
RAS 169 A	CHAMBER MAINTENANCE	RBC, WBC/HGB chamber cleaning - Aperture O ring replacement - Coaxial O ring replacement
RAS 170 A	LIQUID VALVE MAINTENANCE	Liquid valve assy replacement - Valve body replacement
RAS 171 A	POWER SUPPLY CHECK/REPLACEMENT	Voltage supply check - Power supply module replacement Fan operation check.
RAS 176 A	TECHNICIAN FUNCTIONS MICROS 60 CT	Version display. - Adjustments : HGB photometer calibration, Aperture voltage, pressure check, WBC gain , RBC & PLT gain, Sensor, Needle heigth and motion, bubbling. - Temperature sensor adjustment - Run mode - Reagent pack - Serial number - Cycle number - Burning
RAS 173 A	MECHANIC FUNCTIONS	Sensor replacement - Needle motion check - Carriage motion check - Liquid syringe motion check - Vac/Waste syringe motion check - Valve operation check - LCD contrast - Piercing mechanism check
RAS 174 A	DRAIN DETECTION ADJUSTMENT	Drain detection sensor adjustment
RAS 175 A	PCB VOLTAGE CHECKS	Voltage supply check/adj. - Aperture voltage check/adj. - RBC threshold check/adj. - WBC threshold check/adj. - PLT threshold check/adj. - HGB blank voltage check - Stepper motor voltage adjustment
RAS 177 A	LX300 PRINTER	Configuration - Control panel - Control LEds and keys - Description
RAS 178 A	LIQUID SYRINGE MAINTENANCE	Lyse dispenser O ring replacement - Diluent dispenser O ring replacement - Sampling needle dispenser O ring replact. - Lubrification
RAS 179 A	VACUUM/WASTE SYRINGE MAINTENANCE	O ring replacement
RAS 180 A	CHANGING THE INSTRUMENT LANGUAGE	Changing the instrument language
RAS 181 A	REAGENT PACK	Connector O ring replacement
RAS 182 A	BARCODE READER SETUP	Reader configuration
RAS 188 A	HYDRAULIC CYCLE CHECKUP MICROS 60 CT	Step by step control of the hydraulic cycle
RAS 191 A	OVERALL MAINTENANCE	Instrument maintenance step by step
RAS 192 A	DECONTAMINATION	Instrument decontamination
RAS 197 A	DRAIN & RINSE	Instrument rinse and drain for an extended shutdown
RAS 198 A	PIERCING BLOCK	Description - Maintenance - Sampling position

3.2. Required tools and products

TOOLS		PRODUCTS	
DESIGNATION	PART NUMBER	DESIGNATION	PART NUMBER
HEXAGONAL KEYS		EMPTY SAMPLE TUBES	
DYNAMOMETRIC SCREW DRIVER A302	MAG 019 A	SILICONE GREASE	LAM 004 A
DYNAMOMETRIC SCREW DRIVER A301	MAG 020 A	GREASE FOR MECHANICAL ASSEMBLIES	XEA 381 AS
DYNAMOMETRIC SCREW DRIVER A300	MAG 013 A	SOFT TISSUE	
CLAMPS		LIQUID SOAP	
SCALPEL		DISTILLED WATER	
CUTTING PLIERS		MICROPIPETTE TIP	
PAIR OF SCISORS		FLAT PIECE OF STIFF PLASTIC	
VOLTMETER		LATEX WBC	LAD 001 AS
FLAT SCREWDRIVER		LATEX RBC	LAD 002 AS
BARFLEX		FELT PEN	
THERMOMETER		SYRINGE 5ML	
TORX KEYS			

MICROS 60 OT

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• CONCERNS

1 - Unpacking
2 - Working conditions
3 - Visual checks
4 - Reagent connections
5 - Printer and instrument connections
6 - Priming and startup

• REQUIRED TOOLS

Hexagonal keys

• REQUIRED PRODUCTS

- MICROS 60 Reagents : Bottles or Pack.
- Waste container (for bottle model).

• INTERVENTION TIME

- 30 minutes

• FREQUENCY

• SPECIFIC KIT OR CONSUMABLES

- PACK installation kit : XEA 314 A
or
- Bottle installation kit : XEA 332 A

• PROCEDURE

1 - Unpacking

Diag.1

The instrument is enveloped in a special, protective foam before being placed in a cardboard box. Cut the four angles of the box to unpack the system.
Remove the cardboard box containing the **ABX MICROS 60** installation kit from its location (see Diag.1).

2 - Working conditions

• Environment
ABX MICROS 60-*OT* should be operated in an indoor location only. Operation at an altitude over 2000 meters is not recommended. Instrument is designed to be safe for transient voltages according to INSTALLATION CATEGORY II and POLLUTION DEGREE 2.

• Location
ABX MICROS 60-*OT* should be placed on a clean and level table or work station. Please note that **ABX MICROS 60-*OT***, printer and reagents weigh approximately 30 kilograms (66 lbs). Avoid exposure to sunlight. Proper ventilation requires that a space of at least 20 cm (8 inches) must be left behind the apparatus.

• Grounding
Proper grounding is required. Check that the wall ground (earth) plug is correctly connected to the laboratory grounding electricity installation. If there is no ground then use a ground stake. Current electricity norms must be applied.

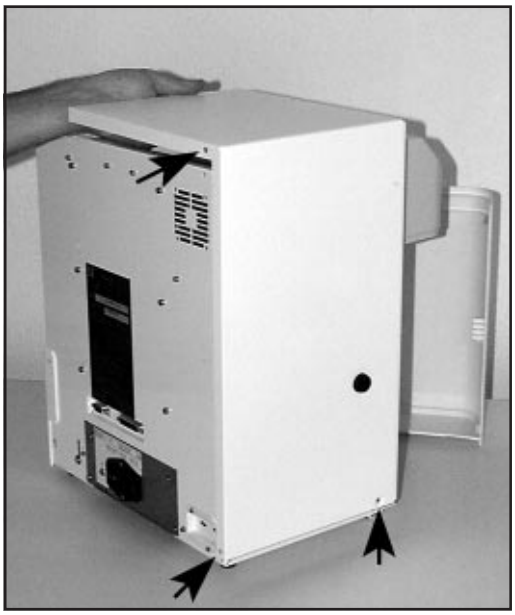
• Humidity and temperature conditions
ABX MICROS 60-*OT* can function between 18 to 32°C (65 to 90°F), with relative humidity, meaning less than 80% with no condensation. If it is kept at a temperature less than 10°C (50°F), the instrument should be allowed to sit for an hour at the correct room temperature before use.

3 - Visual checks

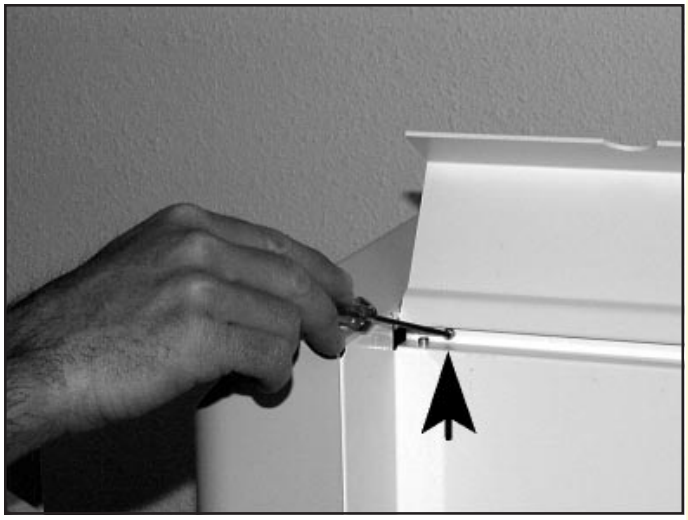
Diag.2

Using the key contained into the installation kit, turn the locker as shown on the Diag. 2 to open the pneumatic protection door.

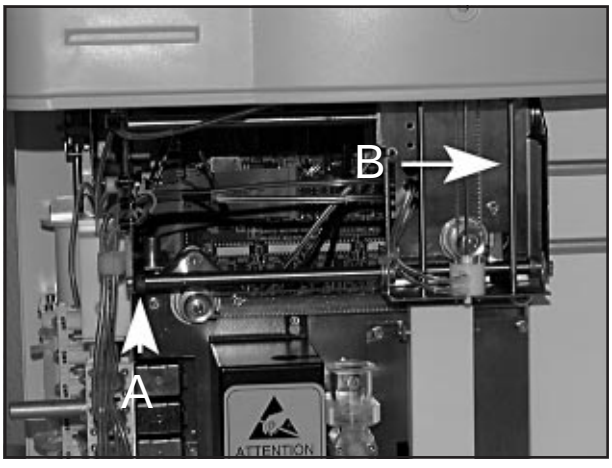
Unscrew the 3 cover fixation screws (Diag. 3) and loosen the 2 tightening screws under the reagent flap (Diag 4).
Remove the cover : pull it backward and lift it up to the rear of the instrument .



Diag.3



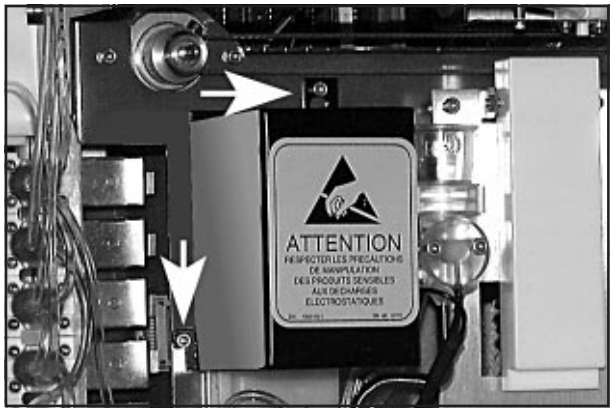
Diag.4



Diag.5

Push the black plastic carriage locking clip (A) as far as possible to the left and place the sample needle carriage (B) as far forward as possible to the right-hand side, as shown in Diag. 5.
Check that the needle is not bent and make sure it is in its upper position.

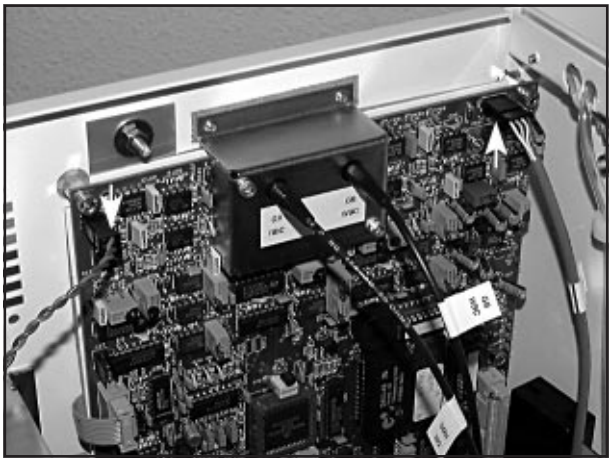
Unscrew slightly the 2 screws of the WBC/HGB chamber protection cover (diag 6). Remove the cover and check that both chambers (RBC/PLT, WBC/HGB) are fixed properly in their clips and the electrode blocks are attached firmly to the chambers (Diag. 7).



Diag.6

Diag.7

Re-install the HGB/WBC chamber cover.



Diag.8

Check that the connectors on the printed circuit board are securely in place (Diag. 8).

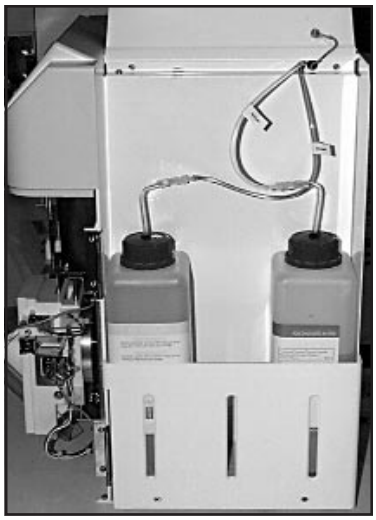
Re-install the instrument cover.

Diag.9

Remove the fuse holder from its location on the rear panel pressing on the holder lock (Diag.9) and check the fuse characteristics : they should be 1 Ampere, 250 Volts Slow-Blow.

4 - Reagent connections

• Bottle connections



Diag.10

Lyse and cleaning reagents are placed inside the reagent compartment as shown in the Diag. 10.
Install the reagent straws and the bottle stoppers.
Connect the blue tube to the MINICLEAN bottle and the white tube to the MINILYSE bottle.
Close the compartment cover.

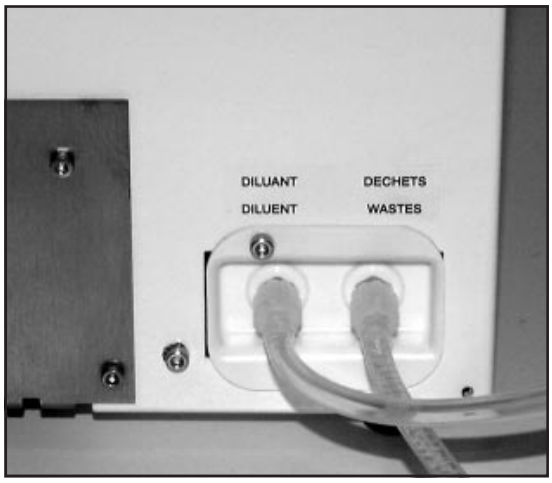
IMPORTANT

When the ABX MICROS 60-*OT* is set up with the 16 or 18 parameters mode, it is mandatory to use specific MINILYSE LMG and MINIDIL LMG reagents.

CAUTION

The Diluent container will be located on the bench at the same level than the instrument.

• Waste connection



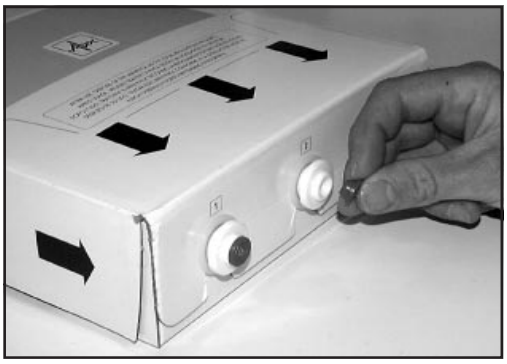
Diag.11

Install the male connectors included in the installation kit at the liquid input and output located at the bottom of the instrument rear panel (Diag.11).
Connect the diluent container (see CAUTION above) using the diluent straw and a 3x6 cristal tube (1 meter maximum) on the diluent input located at the bottom of the instrument rear panel (Diag.11).
Connect the waste container using the cristal tube 3 x 6 on the waste output, and place the waste container below the instrument level (under the bench).

WARNING !

Always follow the recommended procedures for waste disposal. Never connect the instrument wastes directly to the laboratory drain pipes. For each waste container, follow the neutralization procedure as described in the user manal.

• Reagent pack connection
Remove the reagent output protections, as well as the waste input protection (Diag.12 & 13)



Diag.12

Diag.13

Install the pack directly into the compartment of the instrument as shown on the Diag. 14, 15 & 16. Push the pack down in order to plug correctly the pack on the male connectors.

Diag.14

Diag.15

Diag.16

The free male connector (see Diags. 14, 15 & 16) must be plugged on the pack upper valve in order to receive the waste liquids.

CAUTION

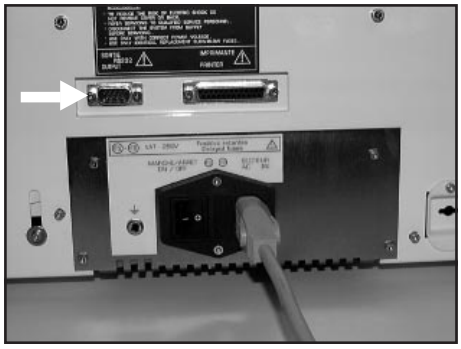
In order to avoid leak problems it is recommended not to unplug several times the same reagent pack.

5 - Printer and instrument connections

• Instrument connection.

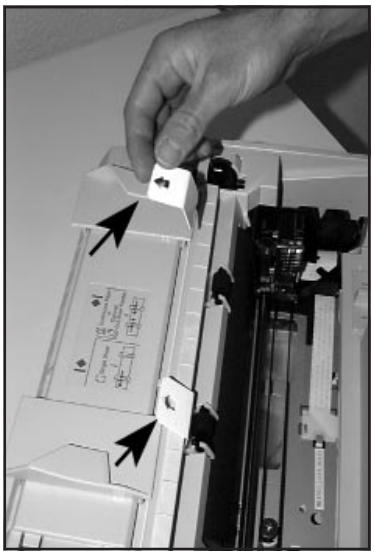
If the instrument has to be connected to a laboratory computer, use the plug RS232.

Connect the power cable to the plug located on the rear left-hand side of the device (Diag. 17).



Diag.17

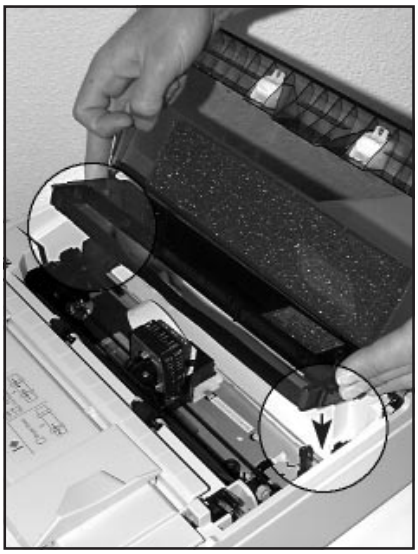
• Setting up the printer
- Remove all the package protections
- Install the paper feed-knob



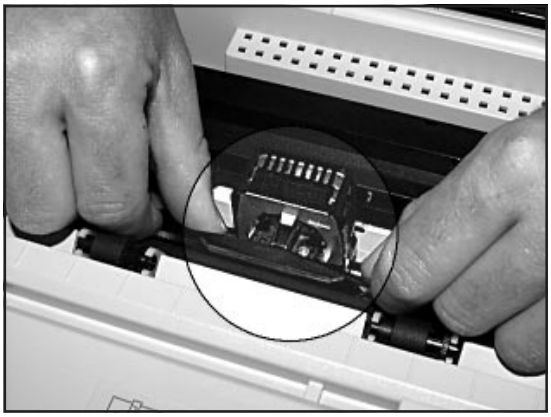
Diag.18

Diag.19

Open the ink ribbon access door at the top of the printer and install the ribbon as shown in diag 20 & 21 : Slide the printer head to the middle of the printer.
Insert the ribbon cartridge into the printer
Guide the ribbon between the print head and ribbon guide.
Slide the printer head from side to side to make sure it moves smoothly.



Diag.20



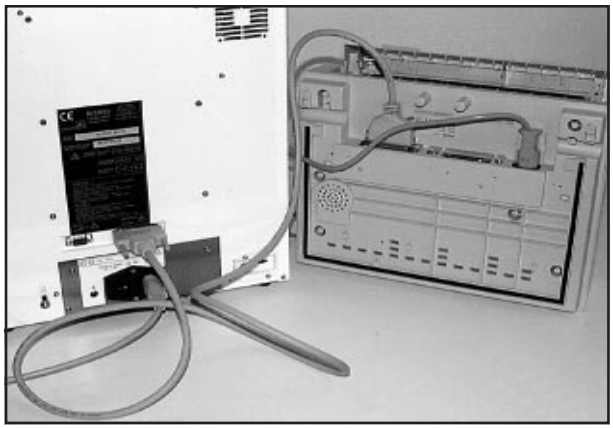
Diag.21

MICROS 60 OT

- Install the paper supports (Diag 22) for single sheets paper use only.

Diag.22

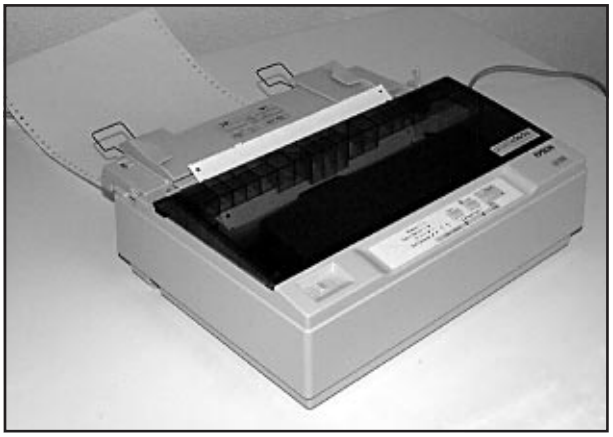
- The printer is connected to **ABX MICROS 60-*OT*** with the cable delivered with the instrument. Lock the connector in place by tightening the 2 screws on each end of the connector to the **ABX MICROS 60-*OT***. Attach the other end of the cable to the printer and lock the printer connector in place by the means of the 2 clips located on the connector itself (Diag. 23).



Diag.23

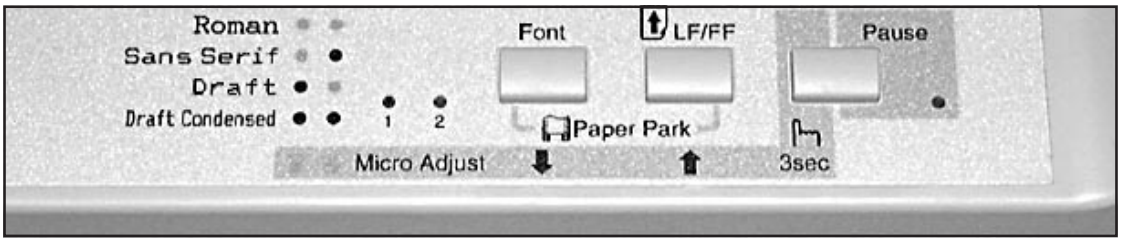
- For continuous paper, introduce it in the slot at the back of the printer and use the sprocket covers to load paper, or else feed the paper frontward when using single sheets (see printer user manual).

Diag.24



Diag.25

• Printer command keys



Diag.26

LED PAUSE : The orange LED PAUSE lights when the printer stops printing. During each power ON, this LED blinks for few seconds and 4 audible beeps occur. When the printer runs out of paper, the LED blinks and 3 audible beeps occur. This LED lights also when the paper is in its tear off position. When a problem occurs, this LED lights ON and 5 audible beeps occur.

LEDS FONT 1 and FONT 2 : These 2 green LEDS indicate the selected font. Refer to the printer user's manual to select the font.

Key FONT : During normal operation, the FONT key allows the font selection. For each pressure on this key, the selection is modified. Refer to the printer user's manual to select the font. When this key is pressed during the printer power ON, the printer setup menu is entered.

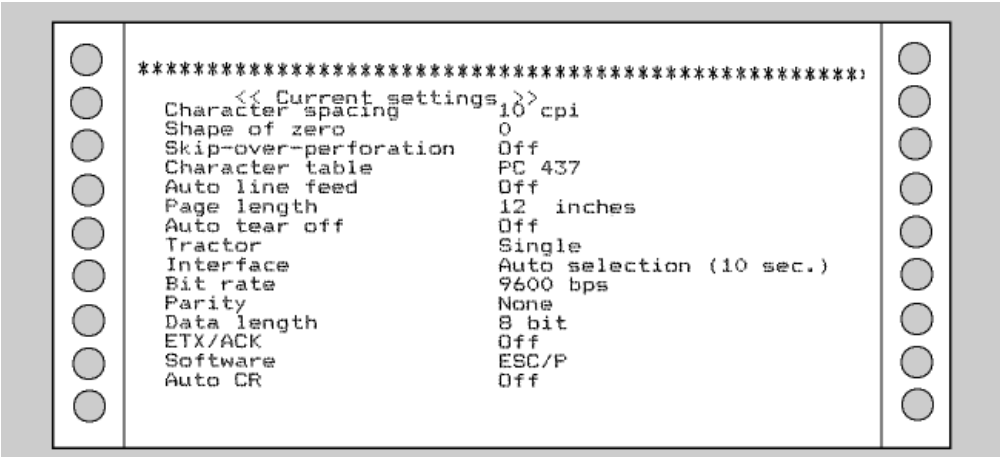
Key LF/FF : During normal operation, a quick pressure on this key allows a ligne feed of the paper. Keep the pressure on this key to feed a whole page. This key can be used to load or eject the paper.

When this key is pressed during the printer power ON, the printing test starts. Key PAUSE : When this key is pressed during the printing, the printout stops. Press again on this key to restart the printout.

PAPER PARK : If Z folded paper is used, the paper can be driven to its parking position when pressing simultaneously on the keys LF/FF and FONT.

MICRO ADJUST : This function allows to adjust the loading paper position. See the user's manual for details.

• Printer Configuration
Switch on the printer when pressing the <FONT>. The configuration should be the following :



Diag.29

Each parameter can be modified by the corresponding parameter chart.
Each chart is accessible using the keys <PAUSE>, <FONT> and <LF/FF> according to the control LED combinations (Diag 30).

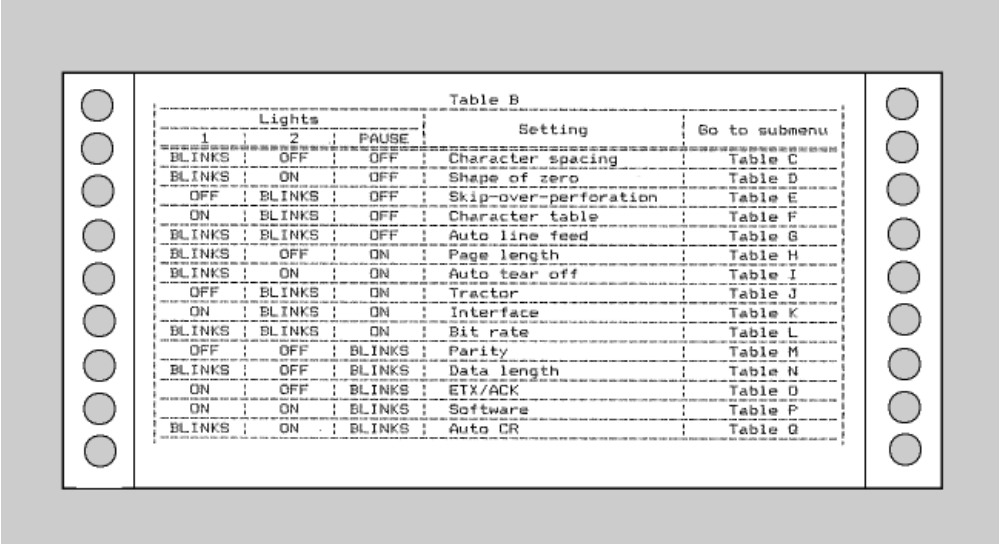


Table B

Lights 1	Lights 2	Lights PAUSE	Setting	Go to submenu
BLINKS	OFF	OFF	Character spacing	Table C
BLINKS	ON	OFF	Shape of zero	Table D
OFF	BLINKS	OFF	Skip-over-perforation	Table E
ON	BLINKS	OFF	Character table	Table F
BLINKS	BLINKS	OFF	Auto line feed	Table G
BLINKS	OFF	ON	Page length	Table H
BLINKS	ON	ON	Auto tear off	Table I
OFF	BLINKS	ON	Tractor	Table J
ON	BLINKS	ON	Interface	Table K
BLINKS	BLINKS	ON	Bit rate	Table L
OFF	OFF	BLINKS	Parity	Table M
BLINKS	OFF	BLINKS	Data length	Table N
ON	OFF	BLINKS	ETX/ACK	Table O
ON	ON	BLINKS	Software	Table P
BLINKS	ON	BLINKS	Auto CR	Table Q

Diag.30

6 - Instrument startup

• Reagent priming

When the **ABX MICROS 60-*OT*** is first installed, it contains no reagents. All the reagents have to be primed now. Turn ON instrument by pressing the ON/OFF switch located on the rear panel. When the instrument turns on, the display shows :

PLEASE WAIT FOR 3 MIN ESCAPE : ESC

This time is required at the startup for the instrument initialization and stabilization, specifically for the HGB diode to reach its operationnal temperature. Press ESC several times in order to abort the cycle : the LED of the front panel turns from red to green and the display shows the following :

STARTUP NOT INITIATED PRESS A KEY TO CONTINUE...

This message appears when the instrument is setup with the manual startup cycle to prevent any analysis cycle before running a startup cycle.
Press any key, the main menu is displayed :

MAIN MENU	1 RESULTS
HH : MM	2 QC ▼

• *Bottles and containers set :*

Install the reagent bottle and carry out a PRIME cycle to clear the reagent line of air bubbles. This procedure should be done whenever a new bottle of reagent is installed.

From the MAIN MENU, move the cursor to the function (4) SERVICE and press ENTER. The service menu is displayed :

SERVICE	1 BACK FLUSH
HH : MM	2 DRAIN CHAMBERS ▼

Move the cursor to function (3) PRIME REAGENTS and press ENTER. The PRIME menu is displayed :

PRIME	1 ALL REAGENTS
HH : MM	2 DILUENT ▼

Select either the function (1) prime ALL REAGENTS or move the cursor next to the required reagent and press ENTER.

The priming cycle starts while the following menu is displayed :

ALL REAGENTS	WAIT FOR 2 MN 3 S
**********	

IMPORTANT

Before analyzing samples, visually inspect reagent lines and pumps for air bubbles. Repeat priming if air bubbles are still present. Call the *ABX representative service department* if priming does not eliminate air bubbles.

Never initiate two Lyse prime cycles back-to-back. This causes excessive foaming in the waste chamber. Run a blank cycle between each Lyse prime cycle.

- Run a STARTUP cycle.

• *Reagent pack*

From the MAIN MENU, move the cursor to the function 4 SERVICE and press ENTER. The service menu is displayed :

SERVICE	> 2 DRAIN CHAMBER ▲
HH : MM	3 PRIME REAGENTS ▼

Move the cursor to 3 PRIME REAGENTS and press the ENTER key. Select the function 1 CHANGE PACK and follow the instructions given by the LCD in order to install the pack.

REAGENT PACK	> 1 CHANGE PACK
HH : MM	2 CBC LEFT < 150> ▼

Once the new PACK is installed a priming cycle will be automatically carried out and the following menu is displayed.

PRIME	WAIT FOR 2 MIN 3 S
* * * * * * * * * *	

IMPORTANT

Before analyzing samples, visually inspect reagent lines and pumps for air bubbles. Repeat priming if air bubbles are still present. Call the *ABX representative service department* if priming does not eliminate air bubbles.

From the REAGENT PACK menu, the function 2 "CBC LEFT" displays the number of analysis cycles left to run with the same pack.

It is also possible to run a priming cycle at any time using the selection 3 "PRIME REAGENTS" of the SERVICE menu.

IMPORTANT

It is recommended not to remove the pack several times before the reagents are totally used in order to avoid leak problems.

- Run a STARTUP cycle.

Once the instrument ready for the analyses, remove the adhesive protection from the front panel (diag 31)

Diag.31

MICROS 60 CT

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• CONCERNS

1 - Unpacking
2 - Working conditions
3 - Visual checks
4 - Reagent connections
5 - Printer and instrument connections
6 - Priming and startup

• REQUIRED TOOLS

Hexagonal keys

• REQUIRED PRODUCTS

Reagents : Bottles or Pack.
Waste container (for bottle model).

• INTERVENTION TIME

30 minutes

• FREQUENCY

• SPECIFIC KIT OR CONSUMABLES

PACK installation kit : XEA 317 A or
Bottle installation kit : XEA 335 A or

• PROCEDURE

1 - Unpacking

Diag.1

The instrument is enveloped in a special, protective foam before being placed in a cardboard box. Cut the four angles of the box to unpack the system.
Remove the cardboard box containing the instrument installation kit from its location (see Diag.1).

2 - Working conditions

• Environment
ABX MICROS 60-*CT* should be operated in an indoor location only. Operation at an altitude over 2000 meters is not recommended. Instrument is designed to be safe for transient voltages according to INSTALLATION CATEGORY II and POLLUTION DEGREE 2.

• Location
ABX MICROS 60-*CT* should be placed on a clean and level table or work station. Please note that **ABX MICROS 60-*CT***, printer and reagents weigh approximately 30 kilograms (66 lbs). Avoid exposure to sunlight. Proper ventilation requires that a space of at least 20 cm (8 inches) must be left behind the apparatus.

• Grounding
Proper grounding is required. Check that the wall ground (earth) plug is correctly connected to the laboratory grounding electricity installation. If there is no ground then use a ground stake. Current electricity norms must be applied.

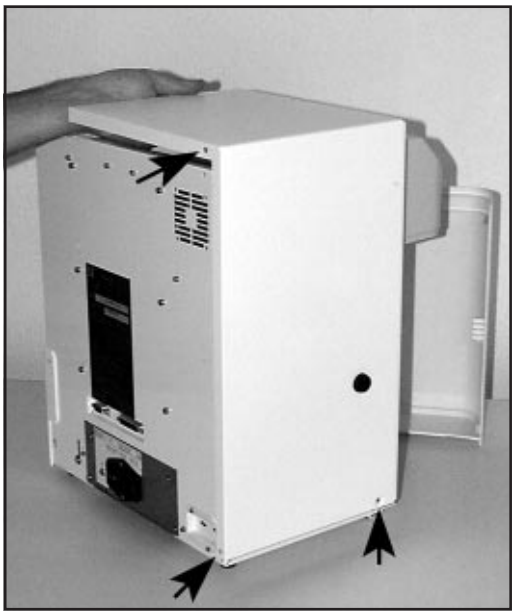
• Humidity and temperature conditions
ABX MICROS 60-*CT* can function between 18 to 32°C (65 to 90°F), with relative humidity, meaning less than 80% with no condensation. If it is kept at a temperature less than 10°C (50°F), the instrument should be allowed to sit for an hour at the correct room temperature before use.

3 - Visual checks

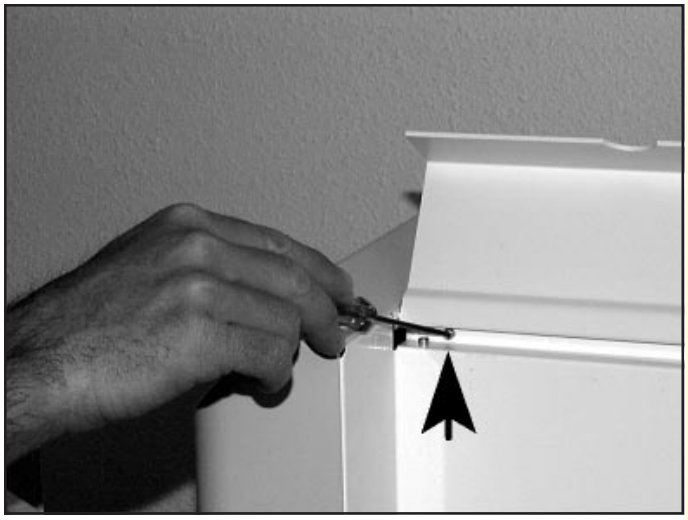
Diag.2

Using the key contained into the installation kit, turn the locker as shown on the Diag. 2 to open the pneumatic protection door.

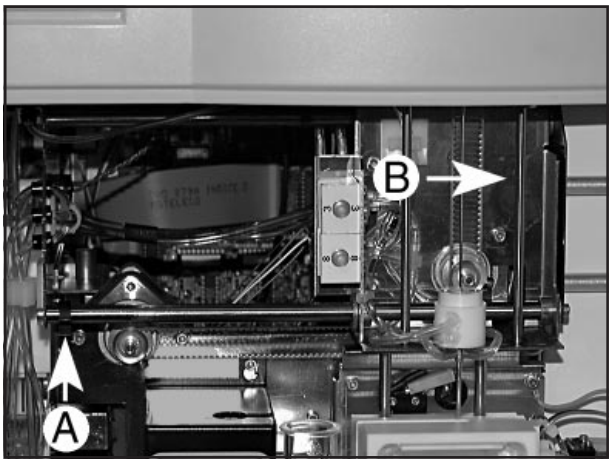
Unscrew the 3 cover fixation screws (Diag. 3) and loosen the 2 tightening screws under the reagent flap (Diag 4).
Remove the cover : pull it backward and lift it up to the rear of the instrument.



Diag.3



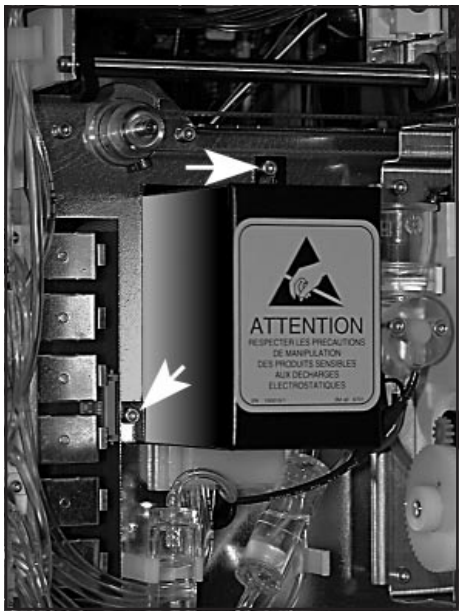
Diag.4



Diag.5

Push the black plastic carriage locking clip (A) as far as possible to the left and place the sample needle carriage (B) as far forward as possible to the right-hand side, as shown in Diag. 5.
Check that the needle is not bent and make sure it is in its upper position.

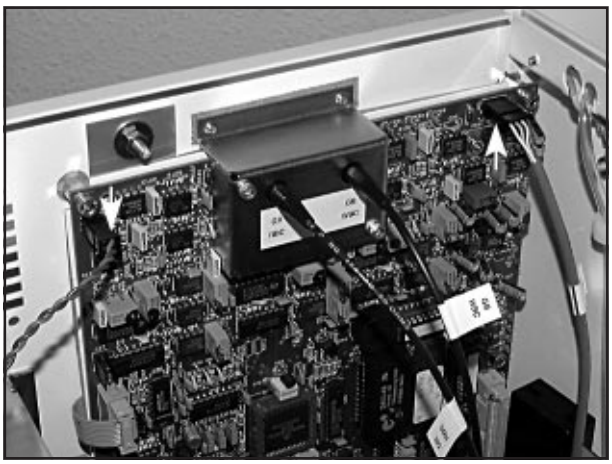
Unscrew slightly the 2 screws of the WBC/HGB chamber protection cover (diag 6). Remove the cover and check that both chambers (RBC/PLT, WBC/HGB) are fixed properly in their clips and the electrode blocks are attached firmly to the chambers (Diag. 7).



Diag.6

Diag.7

Re-install the HGB/WBC chamber cover.



Diag.8

Check that the connectors on the printed circuit board are securely in place (Diag. 8).

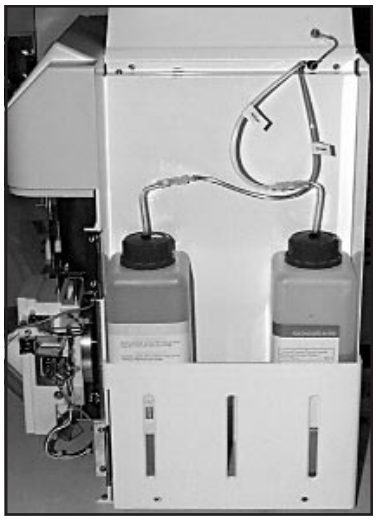
Re-install the instrument cover.

Diag.9

Remove the fuse holder from its location on the rear panel pressing on the holder lock (Diag.9) and check the fuse characteristics : they should be 1 Ampere, 250 Volts Slow-Blow.

4 - Reagent connections

• Bottle connections



Diag.10

Lyse and cleaning reagents are placed inside the reagent compartment as shown in the Diag. 10.
Install the reagent straws and the bottle stoppers.
Connect the blue tube to the MINICLEAN bottle and the white tube to the MINILYSE bottle.
Close the compartment cover.

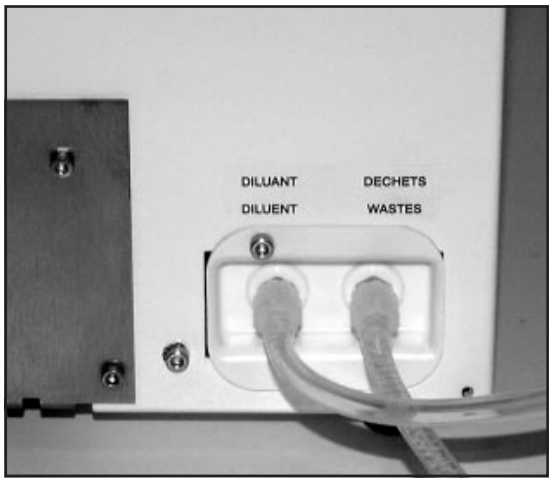
IMPORTANT

When the ABX MICROS 60-*CT* is set up with the 16 or 18 parameters mode, it is mandatory to use specific MINILYSE LMG and MINIDIL LMG reagents.

CAUTION

The Diluent container will be located on the bench at the same level than the instrument.

• Waste connection



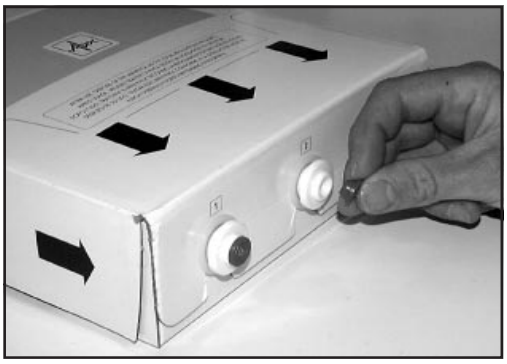
Diag.11

Install the male connectors included in the installation kit at the liquid input and output located at the bottom of the instrument rear panel (Diag.11).
Connect the diluent container (see CAUTION above) using the diluent straw and a 3x6 cristal tube (1 meter maximum) on the diluent input located at the bottom of the instrument rear panel (Diag.11).
Connect the waste container using the cristal tube 3 x 6 on the waste output, and place the waste container below the instrument level (under the bench).

WARNING !

Always follow the recommended procedures for waste disposal. Never connect the instrument wastes directly to the laboratory drain pipes. For each waste container, follow the neutralization procedure as described in the user manal.

• Reagent pack connection
Remove the reagent output protections, as well as the waste input protection (Diag.12 & 13)



Diag.12

Diag.13

Install the pack directly into the compartment of the instrument as shown on the Diag. 14, 15 & 16. Push the pack down in order to plug correctly the pack on the male connectors.

Diag.14

Diag.15

Diag.16

The free male connector (see Diags. 14, 15 & 16) must be plugged on the pack upper valve in order to receive the waste liquids.

CAUTION

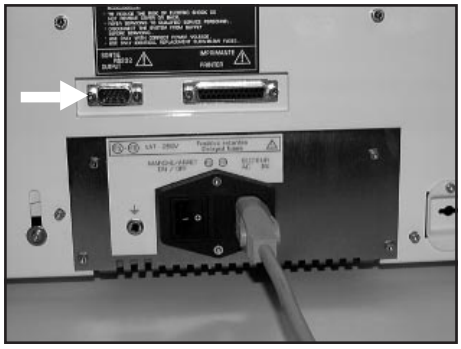
In order to avoid leak problems it is recommended not to unplug several times the same reagent pack.

5 - Printer and instrument connections

• Instrument connection.

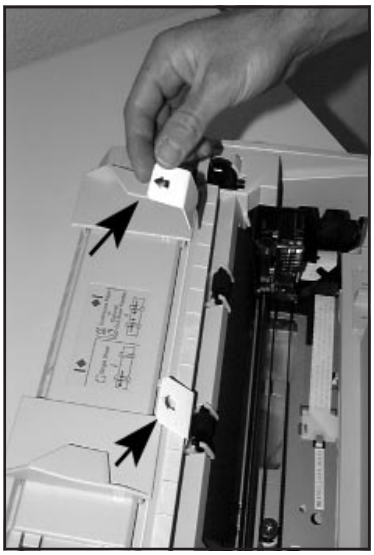
If the instrument has to be connected to a laboratory computer, use the plug RS232.

Connect the power cable to the plug located on the rear left-hand side of the device (Diag. 17).



Diag.17

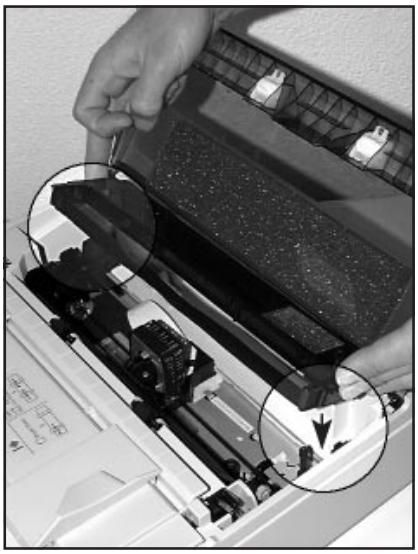
• Setting up the printer
- Remove all the package protections
- Install the paper feed-knob



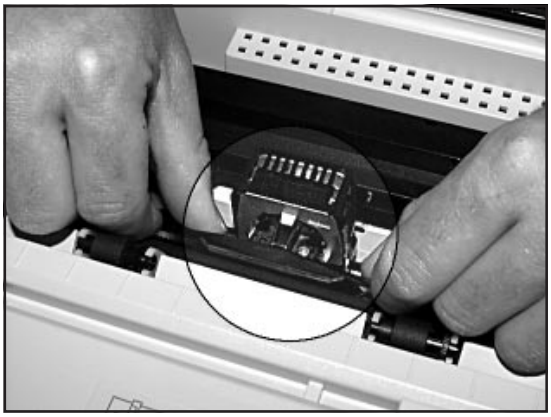
Diag.18

Diag.19

Open the ink ribbon access door at the top of the printer and install the ribbon as shown in diag 20 & 21 : Slide the printer head to the middle of the printer.
Insert the ribbon cartridge into the printer
Guide the ribbon between the print head and ribbon guide.
Slide the printer head from side to side to make sure it moves smoothly.



Diag.20

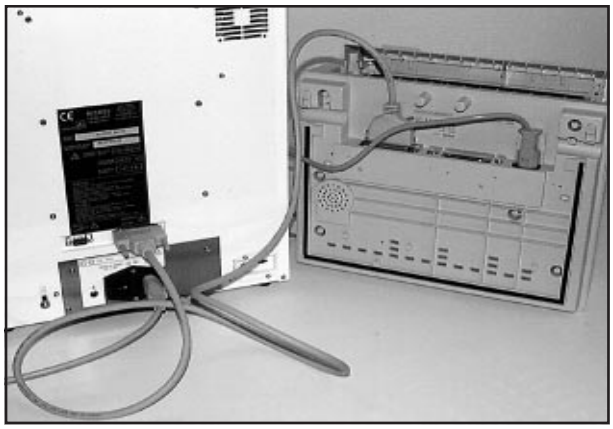


Diag.21

- Install the paper supports (Diag 22) for single sheets paper use only.

Diag.22

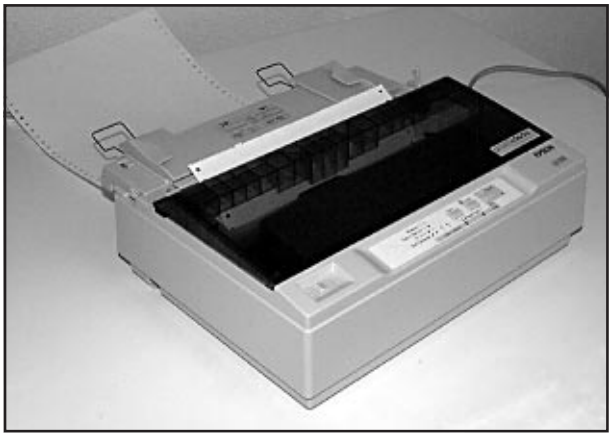
- The printer is connected to **ABX MICROS 60-*CT*** with the cable delivered with the instrument. Lock the connector in place by tightening the 2 screws on each end of the connector to the **ABX MICROS 60-*CT***. Attach the other end of the cable to the printer and lock the printer connector in place by the means of the 2 clips located on the connector itself (Diag. 23).



Diag.23

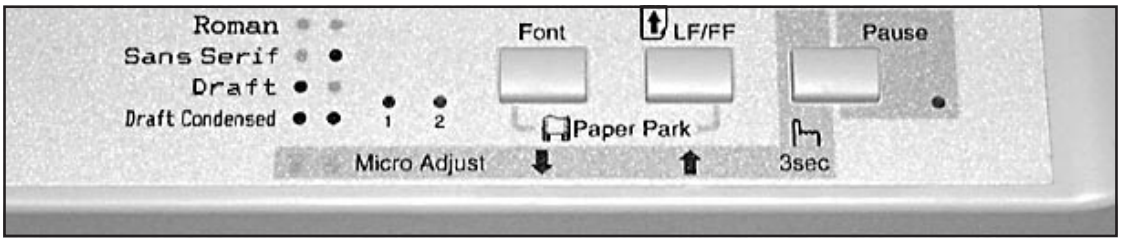
- For continuous paper, introduce it in the slot at the back of the printer and use the sprocket covers to load paper, or else feed the paper frontward when using single sheets (see printer user manual).

Diag.24



Diag.25

• Printer command keys



Diag.26

LED PAUSE : The orange LED PAUSE lights when the printer stops printing. During each power ON, this LED blinks for few seconds and 4 audible beeps occur. When the printer runs out of paper, the LED blinks and 3 audible beeps occur. This LED lights also when the paper is in its tear off position. When a problem occurs, this LED lights ON and 5 audible beeps occur.

LEDS FONT 1 and FONT 2 : These 2 green LEDS indicate the selected font. Refer to the printer user's manual to select the font.

Key FONT : During normal operation, the FONT key allows the font selection. For each pressure on this key, the selection is modified. Refer to the printer user's manual to select the font. When this key is pressed during the printer power ON, the printer setup menu is entered.

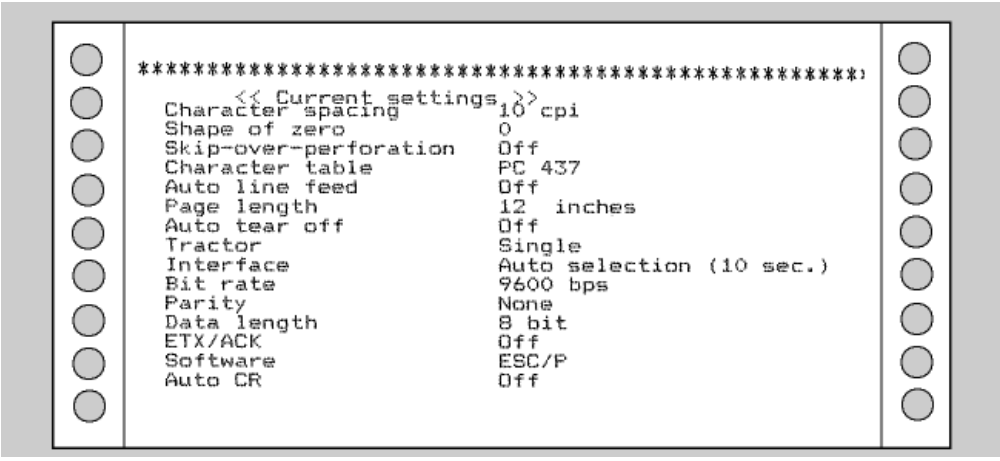
Key LF/FF : During normal operation, a quick pressure on this key allows a ligne feed of the paper. Keep the pressure on this key to feed a whole page. This key can be used to load or eject the paper.

When this key is pressed during the printer power ON, the printing test starts. Key PAUSE : When this key is pressed during the printing, the printout stops. Press again on this key to restart the printout.

PAPER PARK : If Z folded paper is used, the paper can be driven to its parking position when pressing simultaneously on the keys LF/FF and FONT.

MICRO ADJUST : This function allows to adjust the loading paper position. See the user's manual for details.

• Printer Configuration
Switch on the printer when pressing the <FONT>. The configuration should be the following :



Diag.29

MICROS 60 CT

Each parameter can be modified by the corresponding parameter chart.
Each chart is accessible using the keys <PAUSE>, <FONT> and <LF/FF> according to the control LED combinations (Diag 30).

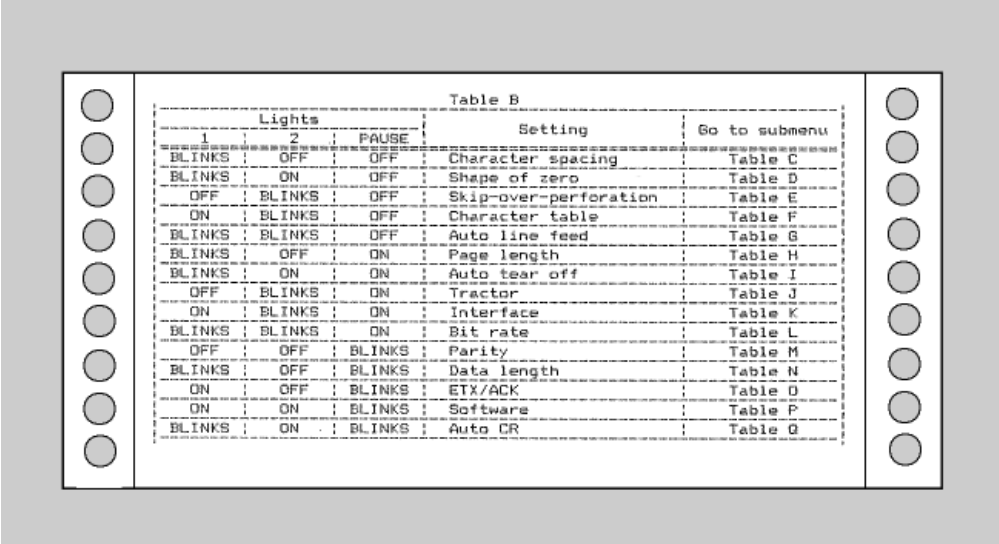


Table B

Lights 1	Lights 2	Lights PAUSE	Setting	Go to submenu
BLINKS	OFF	OFF	Character spacing	Table C
BLINKS	ON	OFF	Shape of zero	Table D
OFF	BLINKS	OFF	Skip-over-perforation	Table E
ON	BLINKS	OFF	Character table	Table F
BLINKS	BLINKS	OFF	Auto line feed	Table G
BLINKS	OFF	ON	Page length	Table H
BLINKS	ON	ON	Auto tear off	Table I
OFF	BLINKS	ON	Tractor	Table J
ON	BLINKS	ON	Interface	Table K
BLINKS	BLINKS	ON	Bit rate	Table L
OFF	OFF	BLINKS	Parity	Table M
BLINKS	OFF	BLINKS	Data length	Table N
ON	OFF	BLINKS	ETX/ACK	Table O
ON	ON	BLINKS	Software	Table P
BLINKS	ON	BLINKS	Auto CR	Table Q

Diag.30

6 - Instrument startup

• Reagent priming

When the **ABX MICROS 60-*CT*** is first installed, it contains no reagents. All the reagents have to be primed now. Turn ON instrument by pressing the ON/OFF switch located on the rear panel. When the instrument turns on, the display shows :

PLEASE WAIT FOR 3 MIN ESCAPE : ESC

This time is required at the startup for the instrument initialization and stabilization, specifically for the HGB diode to reach its operational temperature. Press the ESC key in order to abort the cycle : the LED of the front panel turns from red to green and the display shows :

STARTUP NOT INITIATED PRESS A KEY TO CONTINUE...

This message appears when the instrument is setup with the manual startup cycle to prevent any analysis cycle before running a startup cycle.
Press any key, the main menu is displayed :

MAIN MENU	1 RESULTS
HH : MM	2 QC ▼

Bottles and containers set :

Install the reagent bottle and carry out a PRIME cycle to clear the reagent line of air bubbles. This procedure should be done whenever a new bottle of reagent is installed.

From the MAIN MENU, move the cursor to the function (4) SERVICE and press ENTER. The service menu is displayed :

SERVICE	1 BACK FLUSH
HH : MM	2 DRAIN CHAMBERS ▼

Move the cursor to function (3) PRIME REAGENTS and press ENTER. The PRIME menu is displayed :

PRIME	1 ALL REAGENTS
HH : MM	2 DILUENT ▼

Select either the function (1) prime ALL REAGENTS or move the cursor next to the required reagent and press ENTER.

The priming cycle starts while the following menu is displayed :

ALL REAGENTS	WAIT FOR 2 MN 3 S
**********	

IMPORTANT

Before analyzing samples, visually inspect reagent lines and pumps for air bubbles. Repeat priming if air bubbles are still present. Call the *ABX representative service department* if priming does not eliminate air bubbles.

Never initiate two Lyse prime cycles back-to-back. This causes excessive foaming in the waste chamber. Run a blank cycle between each Lyse prime cycle.

- Run a STARTUP cycle.

Reagent pack

From the MAIN MENU, move the cursor to the function 4 SERVICE and press ENTER. The service menu is displayed :

SERVICE	> 2 DRAIN CHAMBER ▲
HH : MM	3 PRIME REAGENTS ▼

Move the cursor to 3 PRIME REAGENTS and press the ENTER key. Select the function 1 CHANGE PACK and follow the instructions given by the LCD in order to install the pack.

REAGENT PACK	> 1 CHANGE PACK
HH : MM	2 CBC LEFT < 150> ▼

Once the new PACK is installed a priming cycle will be automatically carried out and the following menu is displayed.

PRIME	WAIT FOR 2 MIN 3 S
* * * * * * * * * *	

IMPORTANT

Before analyzing samples, visually inspect reagent lines and pumps for air bubbles. Repeat priming if air bubbles are still present. Call the *ABX representative service department* if priming does not eliminate air bubbles.

From the REAGENT PACK menu, the function 2 "CBC LEFT" displays the number of analysis cycles left to run with the same pack.

It is also possible to run a priming cycle at any time using the selection 3 "PRIME REAGENTS" of the SERVICE menu.

IMPORTANT

It is recommended not to remove the pack several times before the reagents are totally used in order to avoid leak problems.

- Run a STARTUP cycle.

Once the instrument ready for the analyses, remove the adhesive protection from the front panel (diag 31)

Diag.31

SAMPLING NEEDLE MAINTENANCE

MICROS 60 CT

Hématologie

18/06/98

• CONCERNS

- Needle O ring replacement
- Sampling needle replacement
- Piercing needle replacement

• REQUIRED TOOLS

- Hexagonal keys
- Dynamometric screw driver A302 : MAG 019 A

• REQUIRED PRODUCTS

- Silicone grease : LAM 004 A

• INTERVENTION TIME

- 15min

• FREQUENCY

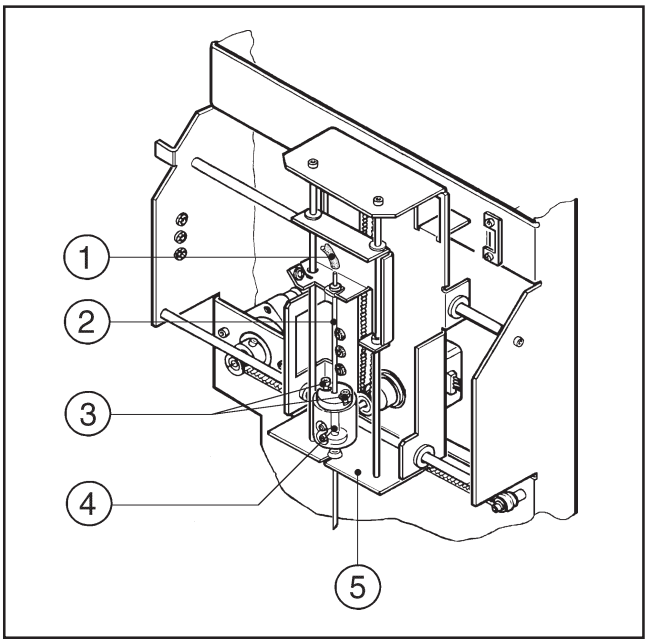
- See frequency chart table for cleaning.
- O ring replacement : 1/year
- Needle replacement : On request only

• SPECIFIC KIT OR CONSUMABLES

- O ring kit : XEA 328 AS
- Sampling needle : GBC 052 A
- Piercing needle : GBC 189 A

SAMPLING NEEDLE MAINTENANCE

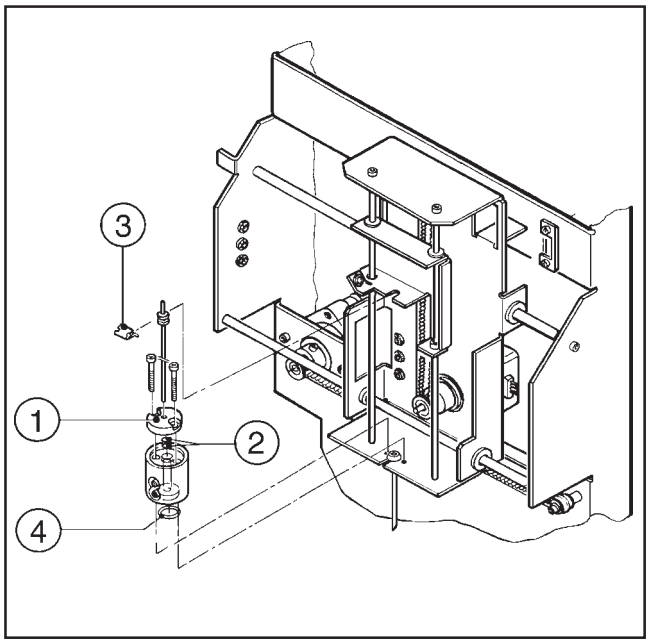
- PROCEDURE



Diag.1

A - Needle or O ring replacement

- Disconnect the tube (1) from the top of the needle (2) (diagram 1). Remove the clip (3) (diagram 2) and manually lift up the sampling needle (Diagram 1).
- Unscrew the 2 screws (3) (Diagram 1) in order to freed the needle rinsing block (4) from the carriage frame (5).



Diag.2

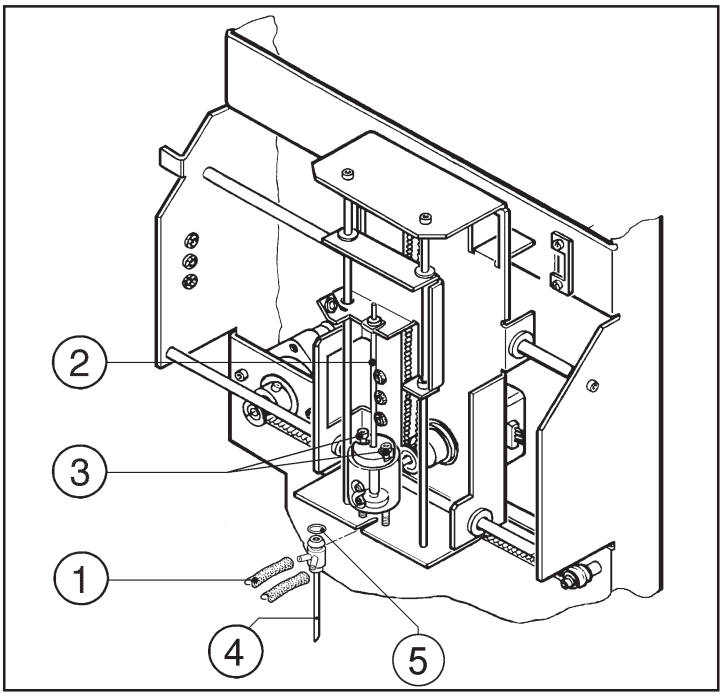
- Remove the rinsing block/needle assy from the carriage taking care not to bend the needle.
- Lift up the O ring holder (1) and replace the O rings (2) by new ones previously greased. Wipe all excess of grease away.
- If necessary clean the inner surface of the rinsing block with a little piece of paper.

Proceed the same way to replace the needle if necessary

- Reassemble in the reverse order. Use a dynamometric screw driver to tighten the screws (3) (Diag.1) to **700 mN.m (99.4 Ozf.in)**.

B - Piercing needle replacement

- Disconnect the tube (1) from the piercing needle (4) (Diag.3).

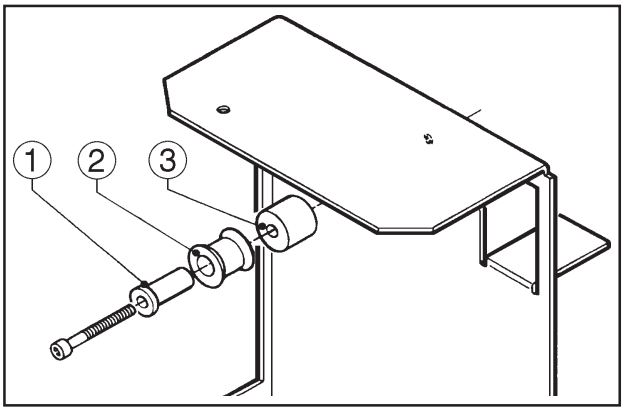


Diag.3

- Lift the needle (2) in the upper position.
- Loosen the 2 screws (3) just enough to enable the rinsing block to be lifted up of about 5 mm.
- Pull the piercing needle (4) (foreward) and replace it by a new one if necessary.
- Replace the piercing needle O ring (5) (FAA 036 A) by a new one.
- Reassemble in the reverse order. Apply the same torque : **700mN.m (99.4 Ozf.in)** to tighten the two screws (3) .

NOTE

It is recommended to check the correct motion of the needle. Proceed as follows :
Enter the «SERVICE» menu and then the sub menu «MECHANIC» and perform a «NEEDLE U/D» cycle.



Diag.4

Blockage problems may occur on some instruments during the needle or carriage motions giving some motor error messages.

Before replacing the concerned motor, it is necessary to check the correct rotation of the free puley located at the end of the notched belt.

Remove the axle screw of the puley and clean its 2 parts and the washer. Reinstall the puley assy, the rounded edge facing the puley. Tighten the screw with a torque of **400mN.m (56.8 Ozf.in)**.

Check that the puley turns freely after the tightening. Add a drop of oil (LAM 007 A) if necessary.

1 - FAG 011 A : Autolub. axle
2 - GBC 146 A : Free pulley
3 - GBC 147 A : Pulley holder

MICROS 60 OT

SAMPLING NEEDLE MAINTENANCE

Hématologie

10/04/98

• CONCERNS

- Needle replacement
- O ring replacement

• REQUIRED TOOLS

- Hexagonal keys : 2,5
- Dynamometric screw driver A300 : MAG 013 A

• REQUIRED PRODUCTS

- Silicone grease : LAM 004 A

• INTERVENTION TIME

- 15 min

• FREQUENCY

- Needle replacement : On request only
- O ring replacements : 1/year

• SPECIFIC KIT OR CONSUMABLES

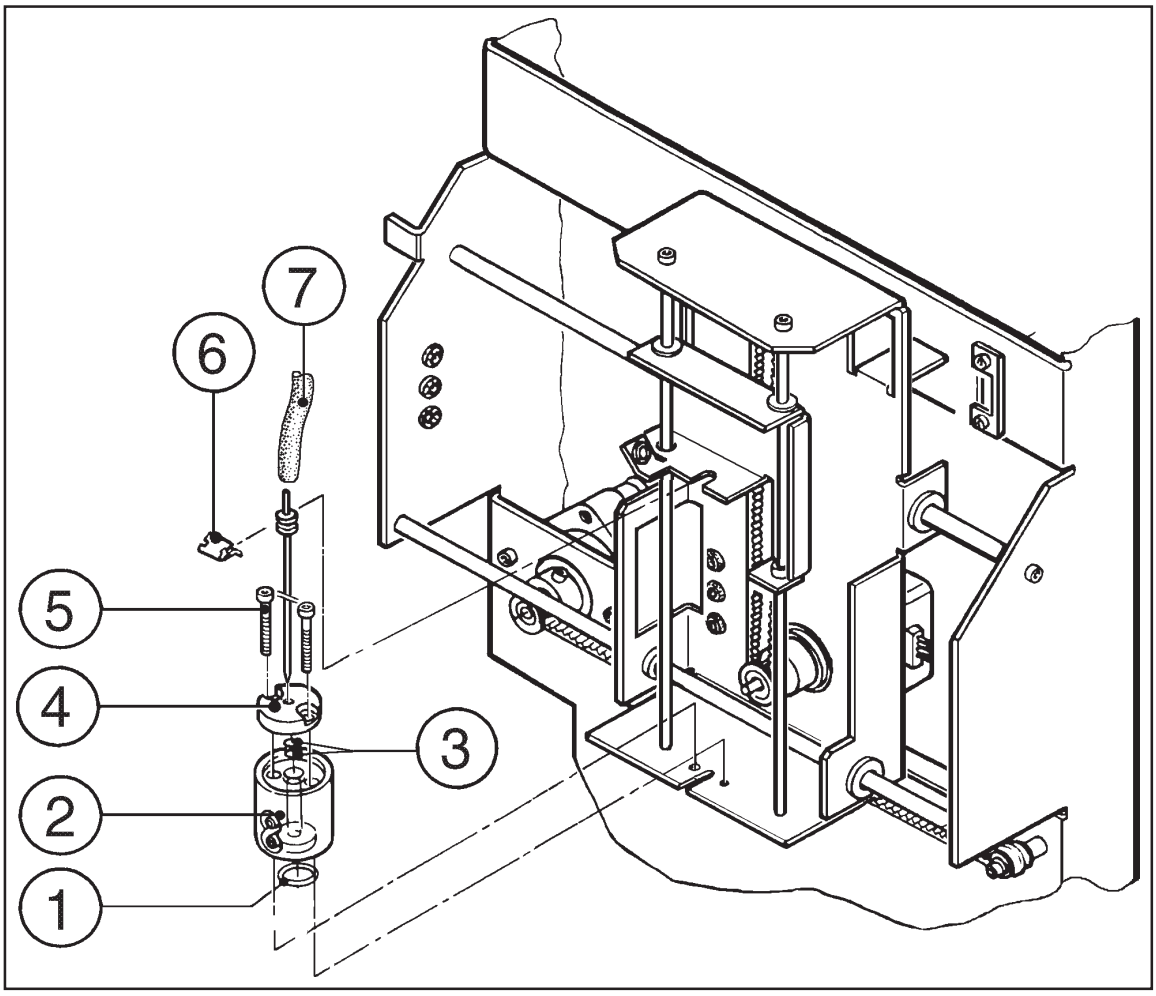
- O ring kit : XEA 328 AS
- Spare parts kit : XEA 458 AS

SAMPLING NEEDLE MAINTENANCE

• PROCEDURE

- Disconnect the tube (7) from the top of the needle. Manually lift up the sampling needle (Diagram 1).

- Unscrew the 2 screws (5) in order to freed the needle rinsing block (2) from the carriage frame. Remove the clip (6) .



Diag.1

- Remove the rinsing block/needle assy from the carriage taking care not to bend the needle.

- If necessary clean the inner surface of the rinsing block by means of a little piece of soft paper. Spread a little amount of grease in between the rinsing block (2) and its support.

- Lift up the O ring holder (4) and replace the O rings (3) by new ones previously greased. Wipe all excess of grease away.

NOTE Proceed the same way to replace the needle if necessary

- Reassemble in the reverse order. Use a dynamometric screw driver to tighten the screws (5) (Diag.1) to 100 mN.m.

NOTE

It is recommended to check the correct motion of the needle. Proceed as follows :
Enter the «SERVICE» menu and then the sub menu «MECHANIC» and perform a «NEEDLE UP/DOWN» cycle.

Blockage problems may occur on some instruments during the needle or carriage motions giving some motor error messages.

Before replacing the concerned motor, it is necessary to check the correct rotation of the free pulley located at the end of the notched belt.

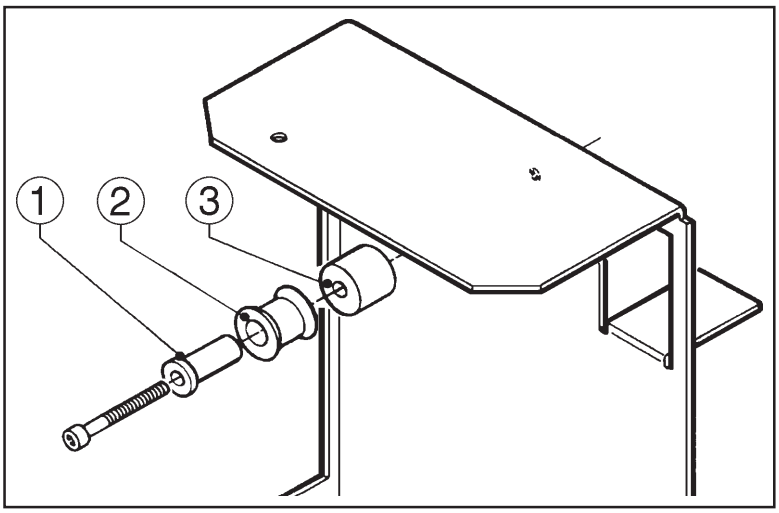
Remove the axle screw of the pulley and clean its 2 parts and the washer.Reinstall the pulley assy, the rounded edge facing the pulley. Tighten the screw with a torque of **400mN.m (99.4 Ozf.in)**.

Check that the pulley turns freely after the tightening. Add a drop of oil (LAM 007 A) if necessary.

(1) - FAG 011 A : Autolub. axle

(2) - GBC 146 A : Free pulley

(3) - GBC 147 A : Pulley holder



Diag.2

CHAMBER MAINTENANCE

MICROS 60

Hématologie
10/04/98

• CONCERNS

- RBC & WBC/HGB cleaning
- Aperture O ring replacement
- Coaxial O ring replacement

• REQUIRED TOOLS

- Hexagonal keys : 2,5
- Soft paper
- Dynamometric screw driver : MAG 013 A
- Cutting pliers

• REQUIRED PRODUCTS

- Liquid soap
- Distilled water
- A scalpel
- A Micropipette tip

• INTERVENTION TIME

- 30 min

• FREQUENCY

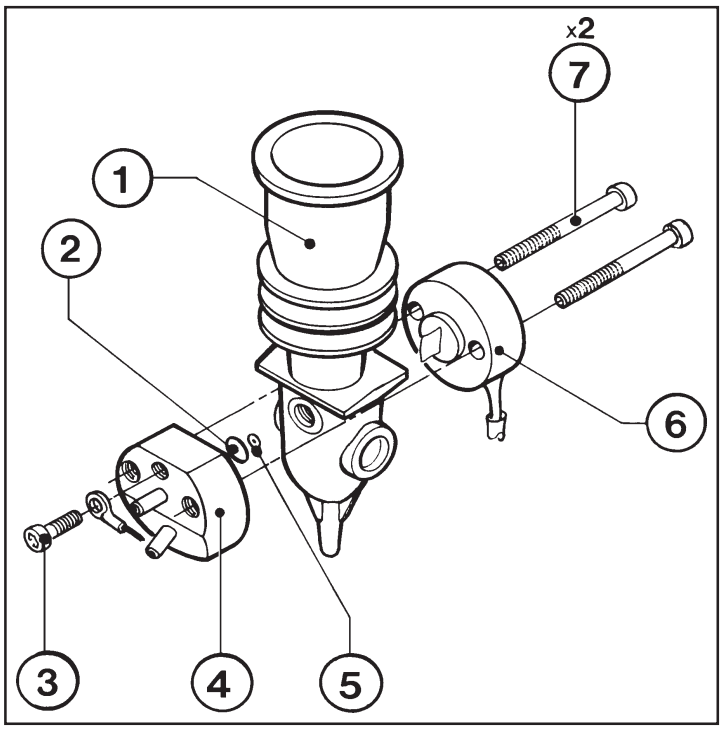
- RBC & WBC cleaning : 2 (type 1 & 2) or 3/year (type 3).
- Aperture O ring replacement : 1/year
- Electrode O ring replacement : 1/year

• SPECIFIC KIT OR CONSUMABLES

- O ring kit : XEA 328 AS

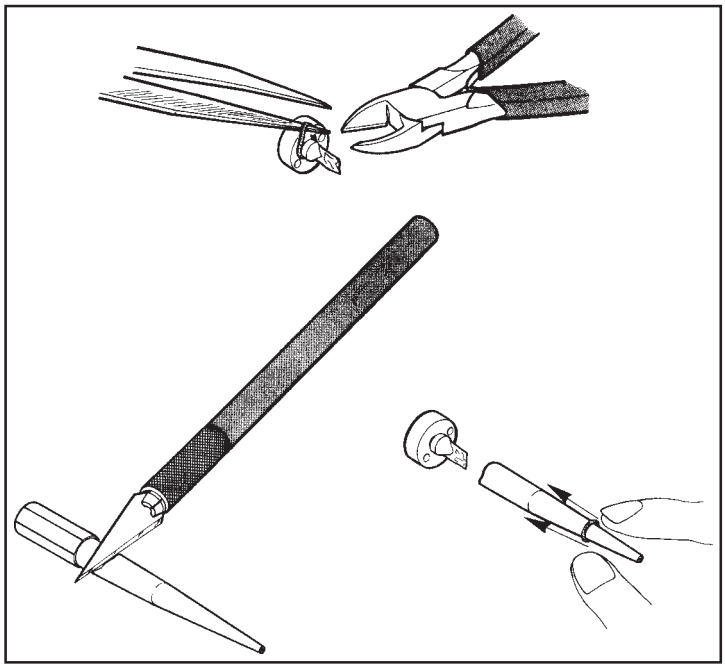
• PROCEDURE

1 - RBC chamber cleaning :



Diag.1

- Run a drain chamber cycle (SERVICE menu, DRAIN CHAMBERS Sub menu).
- Record the tube positions before dismantling the chambers.
- Disconnect the chamber tubes.
- Unclip the RBC chamber.
- Dismantle the electrode (6) loosening the 2 fixation screws (7) and the terminal holding screw (3) (Diagram 1).



Diag.2

• Electrode O ring replacement :

- Use a previously cut micropipette tip to replace the electrode O ring as shown on Diag.2.

• Aperture O ring replacement :

- Install the chamber over a piece of white paper or cloth.
- Carefully remove the counting head (4) and plunge the aperture (5) in distilled water.

Replace the O ring (2) by a new one.

- Clean the chamber and the counting head with liquid soap, do not introduce any sharp instruments inside so as to avoid damaging the inside of the chamber and the aperture.

CAUTION

Do not manipulate the aperture using hard instruments. Clean the aperture with a piece of soft paper or preferably, in between 2 fingers.

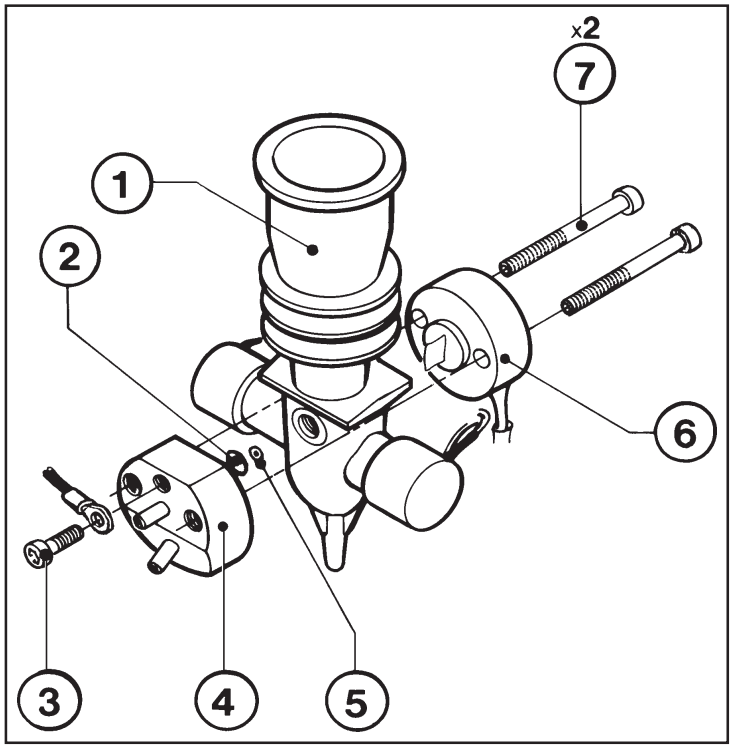
- Rinse thoroughly with distilled water
- Dry the exterior of the chamber with a soft paper.

CAUTION

- Do not apply too much pressure on the electrode fixation screws, as it can break the aperture (tightening torque = 100mN.m / 14.2 Ozf.in).
- It is recommended to reconnect the tubes on the counting head before reassembling the "electrode/chamber/counting head" assy in order to avoid applying constraint on the chamber.

- Position the chamber in its fixation clips.
- Reconnect the tubes

2 - WBC/HGB chamber cleaning :



Diag.3

- Run a drain chamber cycle (SERVICE menu, DRAIN CHAMBERS Sub menu).
- Loosen the cover screws of the WBC/HGB chamber and remove the cover.
- Record the tube positions before dismantling the chambers.
- Disconnect the chamber tubes.
- Unclip the RBC chamber.
- Dismantle the electrode (6) loosening the 2 fixation screws (7) and the terminal holding screw (3).
- Proceed as described in ***1 - RBC chamber*** to clean the chamber and to replace the lectrode and aperture O rings.

NOTE

The spectrophotometer can not be dismantled from the chamber. If this one has been dammaged it is necessary to replace the whole chamber assy. When cleaning the spectrophotometer, make sure to thoroughly rinse it in order to obtain a correct HGB blank measure.

MICROS 60

LIQUID VALVE MAINTENANCE

Hématologie

14/04/98

• CONCERNS

Liquid valve assy replacement
Valve body replacement

• REQUIRED TOOLS

Hexagonal keys
Pair of pliers

• REQUIRED PRODUCTS

Soft paper

• INTERVENTION TIME

15 min

• FREQUENCY

On request only

• SPECIFIC KIT OR CONSUMABLES

6 Valve assembly (**MICROS 60 *CT***) : XDA 579 CS
6 Valve assembly (**MICROS 60 *OT***) : XDA 578 CS
5 Valve assembly : XDA 580 CS
2 ways NC liquid valve without solenoïd : XDA 481 B
3 ways liquid valve without solenoïd : XDA 483 B
Solenoïd 24V 4W : EAZ 004 A

MICROS 60

• PROCEDURE

- Several reasons can unable the correct operations of the valves :

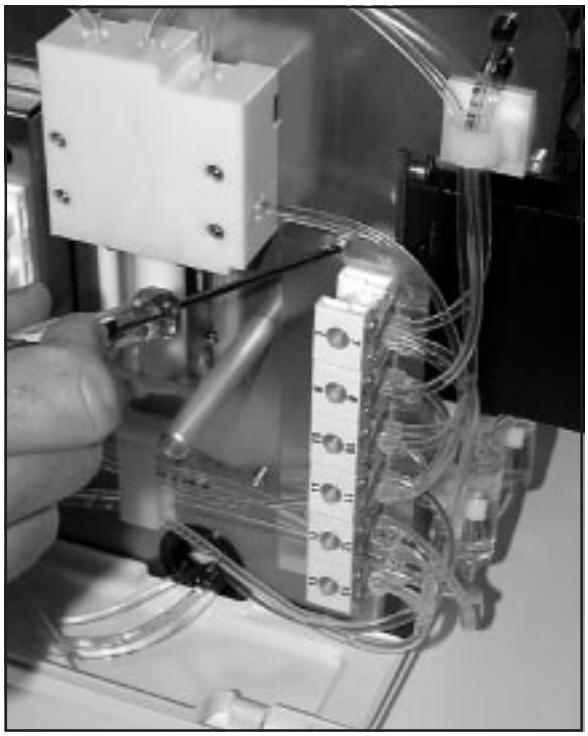
  - Leaks on the valve bodies
  - Defective Solenoïds
  - Liquid discharge on valves
  - Corrosion traces on the axis, ect...

- Run a «DRAIN CHAMBERS» cycle.

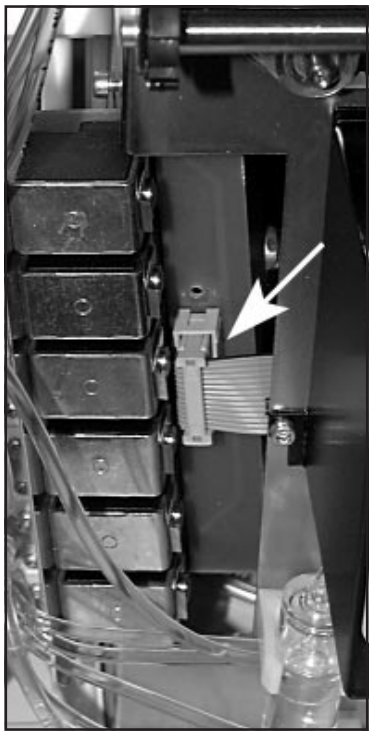
- Switch off the instrument.

- Note the tube positions on the valve assembly that requires to be dismantled.

- Unscrew the valve assembly fixation screws (Diag.1).



Diag.1



Diag.2

- Disconnect the supplying flat cable from the valve assembly (diag.2).

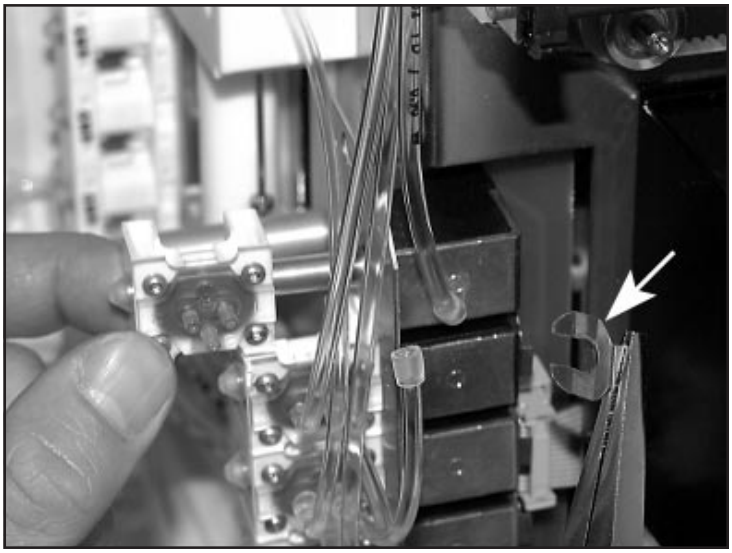
NOTE When leaks occur on valves it is recommended to replace the entire valve assembly by a new one.

- If only one valve has been damaged it is possible to dismantle the valve body on its own as shown on the diagram 3 : use a pair of pliers to disconnect the valve holder clip and remove the body.

CAUTION

When replacing one valve only, it is important to check if the «neighboured» valves have not been damaged too.

When replacing one valve only, it is important to check if the «neighboured» valves have not been damaged too.



Diag.3

CAUTION

The solenoïd can not be dismantled unless unsoldering it.
If this one is suspected solder a new one or replace the entire valve assembly.

- Reconnect the tubes on the nipples (with the sleeves).
- Re-install in the reverse order. Switch on the instrument.
- Control the watertightness of the valves and check for the correct operations :
Go to «SERVICE» menu, then to «MECHANIC» sub menu (5) and require a «VALVES» (6) test (see Mechanic functions : RAS 173 A).
- Check the calibration too.

• REMARKS

On **MICROS 60 - *CT***, when piercing several times the same tube cap, some pieces of cork may be dragged along towards the WBC/HGB chamber and then the liquid valve (12).
This may damaged the operation of the valve.

MICROS 60

POWER SUPPLY CHECK OR REPLACEMENT

Hématologie

10/04/98

• CONCERNS

- Voltage supply check
- Power supply module replacement
- Fan operation check

• REQUIRED TOOLS

- Hexagonal keys
- Flat screw driver
- Volmeter

• REQUIRED PRODUCTS

- None

• INTERVENTION TIME

- 15 min

• FREQUENCY

- 1/year

• SPECIFIC KIT OR CONSUMABLES

- None

- PROCEDURE

1 - Supply voltage check

CAUTION

The supply voltage check has to be done with the power supply module connected only.

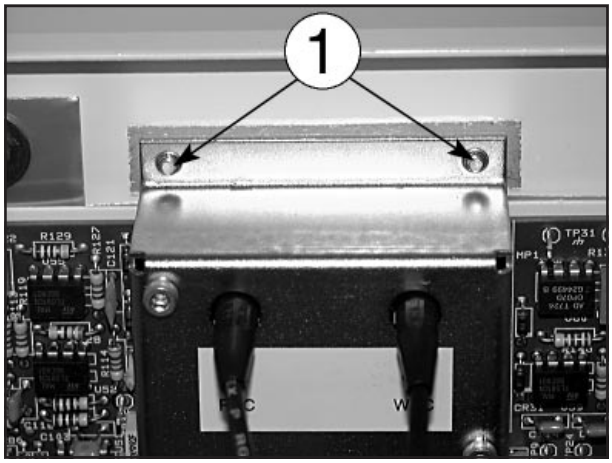
- The supply voltage check is done on the mother board (XAA 355 A) according to the following chart table :

* Ground on TP31, TP 30 or TP 29

TEST POINTS	VOLTAGES
TP 20	-12V ± 0,5V
TP 22	24V + 1.5V - 0V
TP 23	5V + 0,3V - 0V
TP21	12V ± 0,5V

CAUTION

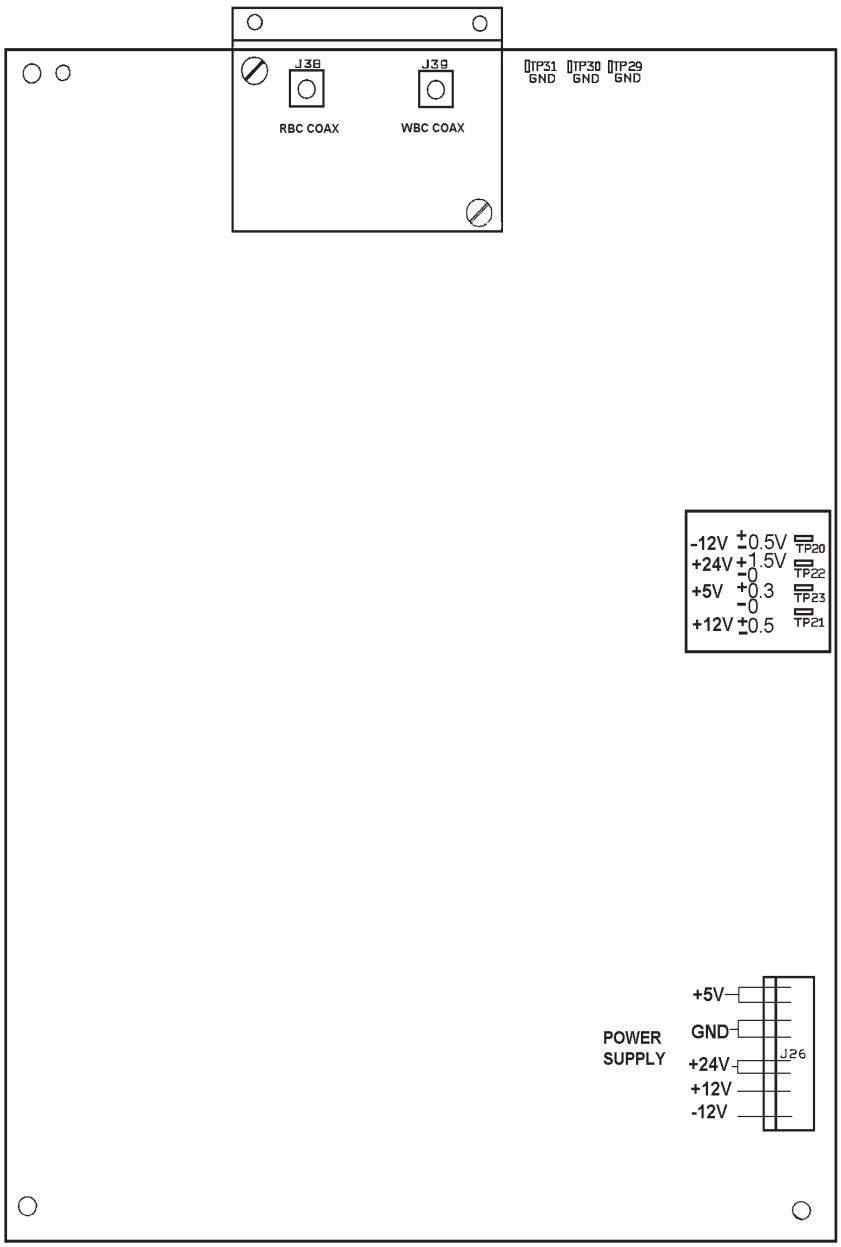
The two screws on the top of the coaxial cover holding the board on the MICROS frame are the grounding connection of the mother board (diag 1). It is mandatory to check the correct tightening of these screws to obtain correct voltage values.



Diag.1

POWER SUPPLY CHECK OR REPLACEMENT

The test points are located as shown on the diagram below :



Diag.2

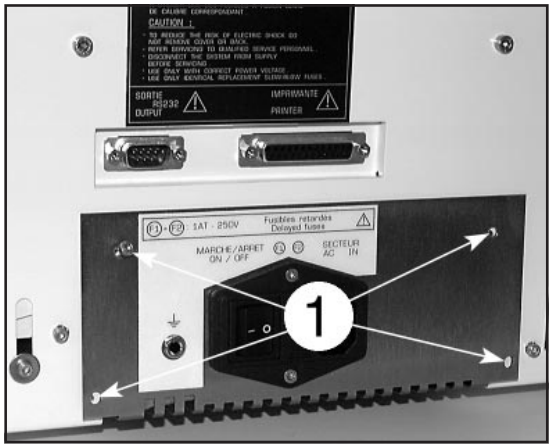
NOTE If the voltages values are not correct or among the ranges no adjustment can be carried out either on the board or on the power supply module. Replace the power supply module as described below :

MICROS 90

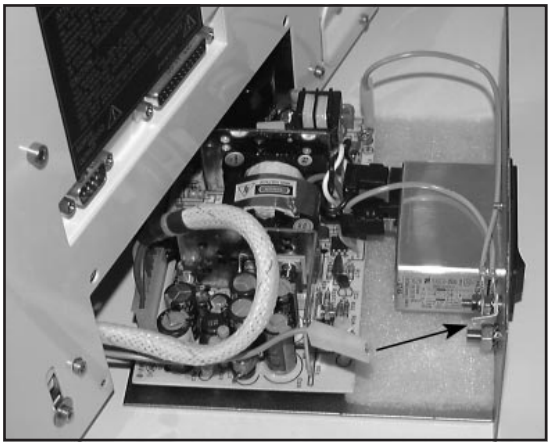
POWER SUPPLY CHECK OR REPLACEMENT

2 - Power supply module replacement

- Switch off the instrument.
- Disconnect the main supply voltage cable and the printer cable.
- Disconnect the power supply cable from the mother board, connector J26 (see Diag.2).
- Unscrew the 4 screws (1) (Diag.3) and start to move out the power supply module. Disconnect the grounding wire (Yellow/green wire see diag 4) from the rear panel of the module.
Route the cable (from J26) down to make the removing of the module easier.



Diag.3



Diag.4

WARNING !

The power supply module internal fuse is not to be replaced even when this one has blown down.

- Replace the power supply module by a new one and reinstall in the reverse order.
- Switch on the instrument and check the voltages on the mother board as described in the previous paragraph.

• REMARKS

The four leds in front of the test points are lit to indicate a voltage presence but whatever its value!!!

Check the operation of the fan as following : When the fan has stopped, move the cursor to the 4 SERVICE menu and press ENTER : the fan should start.

TECHNICIAN FUNCTION

Hématologie

16/06/98

• CONCERNS

1 - Version display.
2 - Adjustments
HGB photometer calibration, Aperture voltage
Vacuum check, WBC gain, RBC & PLT gain
Sensor, Needle heigth, Needle motion
Bubbling
3 - Temperature sensor adjustment
4 - Run mode
5 - Reagent pack
6 - Serial number
7 - Cycle number
8 - Burn-in

• REQUIRED TOOLS

- Flat screw driver
- thermometer
- Barflex
- Hexagonal keys
- Voltmeter

• REQUIRED PRODUCTS

- WBC latex : LAD 001 AS
- RBC and PLT latex : LAD 002 AS
- Soft paper
- Flat piece of stiff plastic

• INTERVENTION TIME

- 60 min

• FREQUENCY

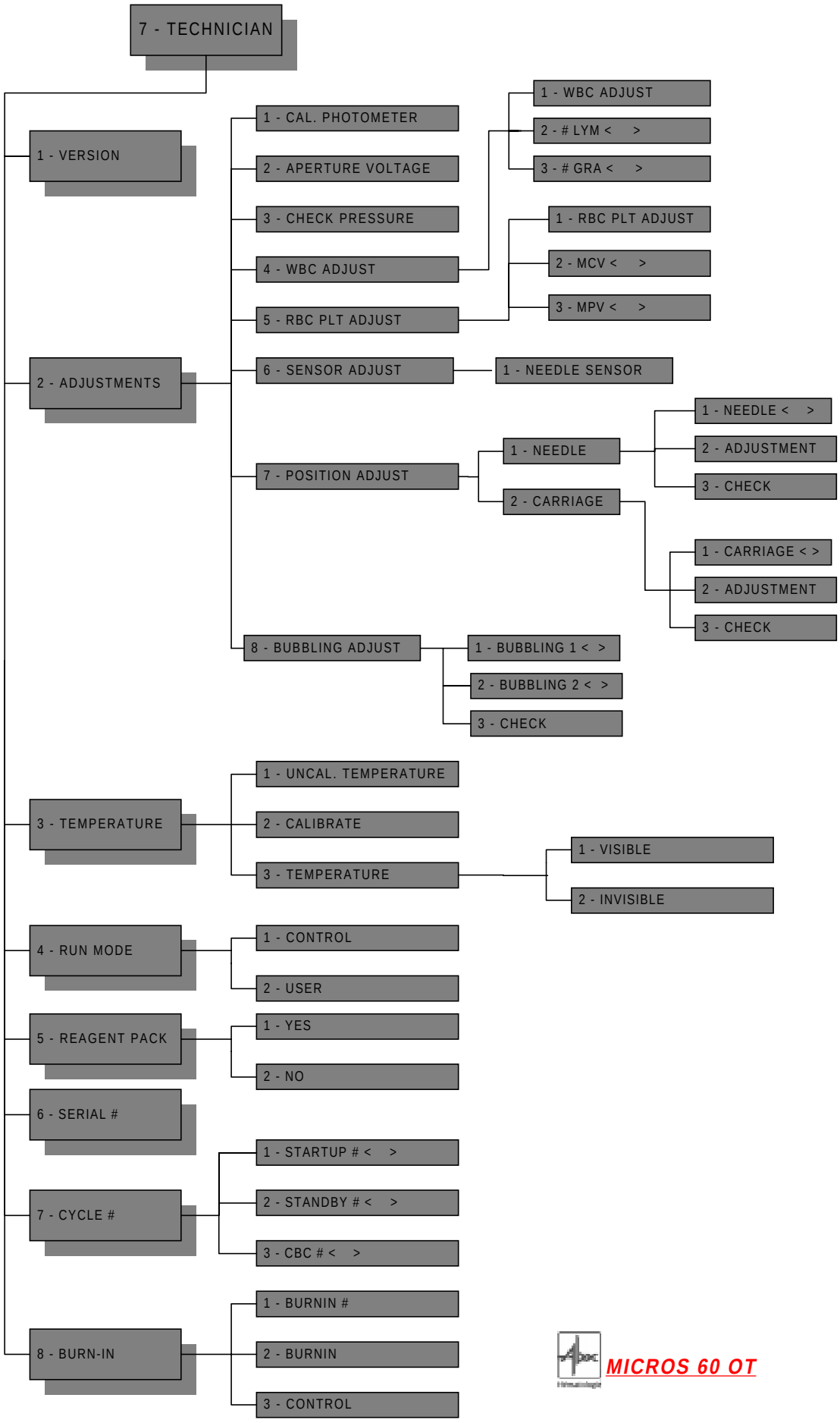
- See maintenance chart table.

• SPECIFIC KIT OR CONSUMABLES

- Needle position tool : GBC 218 A

TECHNICIAN FUNCTION

- PROCEDURE



Once entering the «SERVICE» sub menu, move to «TECHNICIAN FUNCTIONS» and press Enter . A specific password (421) is required to enter the sub menus.

Move the cursor by means of ▼ and ▲ and choose the required menus pressing the Enter key.

I - The version number is displayed.

II - Adjustments :

1 - HGB photometer calibration

- Dismantle the WBC/HGB chamber cover.

- Check the general cleanliness of the WBC chamber/spectrophotometer assy.

- Re-install the chamber cover.

NOTE If the WBC chamber has been dismantled previously make sure no liquid has flown in between the spectrophotomer and the chamber.
Clean the inner surfaces of the spectrophotometer as well as the chamber.
Reassemble the assy and tighten the two screws to the following torque : 400mN.m (see RAS 169 A : Chamber maintenance)

- Run the CAL PHOTOMETER function (function 1 of the «ADJUSTMENTS» menu) : diluent is delivered to the WBC/HGB chamber twice.

An HGB channel is displayed on the LCD screen :

VALUE XXX

IMPORTANT

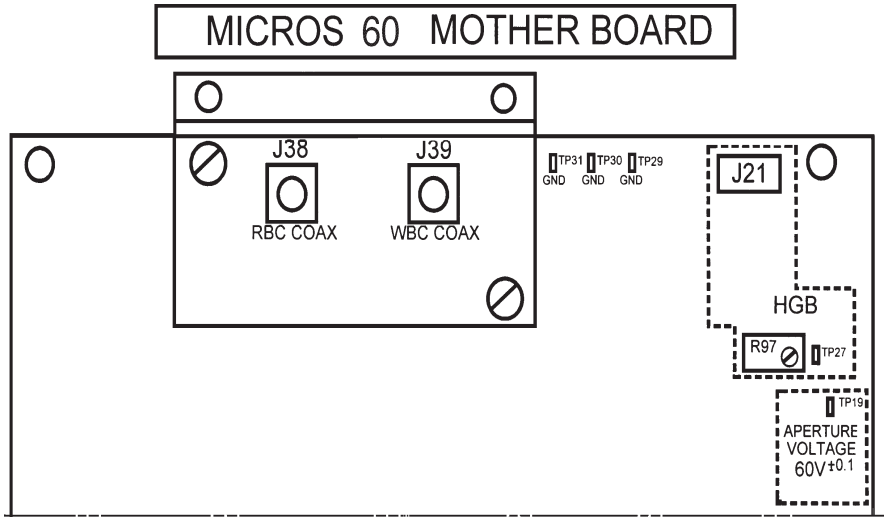
1 - The HGB photometer calibration must be done 20min at least after the instrument has been switched on.
2 - This adjustment must be done with the WBC chamber cover installed!!!

- By means of **R97** (See diagram 1) adjust the HGB channel according to the room temperature using the chart table given on next page.

NOTE After 40 seconds approximately, the function is automatically exited.

- Run the CAL PHOTOMETER function again to verify the adjustment.

MICROS 60 OT



Diag.1

ROOM TPT (°C)	CHANNEL		
	Mini.	Nominal	Maxi.
15	240	245	250
16	240	245	250
17	239	244	249
18	238	243	248
19	237	242	247
20	236	241	246
21	235	240	245
22	234	239	244
23	234	239	244
24	233	238	243
25	232	237	242
26	231	236	241
27	230	235	240
28	229	234	239
29	228	233	238
30	228	233	238
31	227	232	237
32	226	231	236
33	225	230	235
34	224	229	234
35	223	228	233

2 - Aperture voltage

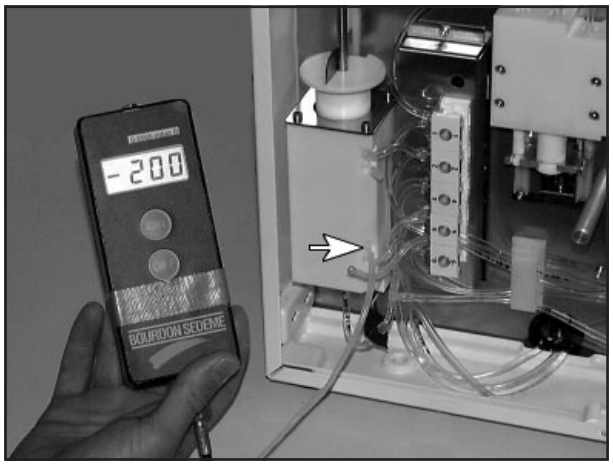
- Once entering the «APERTURE VOLTAGE» menu, connect a voltmeter between the ground (TP30) and TP19.

- Check that the value is **60V** +**2.8V -1.5V** (Diagram 1). The aperture voltage is not adjustable.

- Press any key to escape.

3 - Vacuum check

Enter the 2 - ADJUSTMENTS / 3 - CHECK PRESSURE menu.



Diag.2

- Disconnect the tube from the vacuum/waste syringe coming from the valve (see diagram 2).

- Follow the instructions given on the LCD screen :

«PLEASE PLUG BARFLEX ON AIR SYRINGE» (On the free nipple).

«CHECK PRESSURE : -200mB ± 10mB» (The piston has raised in order to create a vacuum in the syringe body).

- Check the stability of the vacuum during 30 secondes : The vacuum drop down must be ≤ 2 mbar.

- If the results are not correct check the O ring and the tubing watertightness.

«PLEASE RECONNECT PREVIOUS TUBE» (disconnect the Barflex and replug the tube instead).

4 - WBC adjust

- Put the WBC latex to mix on a Vortex during 1min or shake thoroughly

IMPORTANT

As the WBC gain is a factory adjustment it is mandatory not to readjust it without taking the following precautions :
Carry out previously, an autoconcentrated cleaning to make sure of the cleanliness of the WBC counting circuit.
If necessary clean the WBC chamber aperture as described in RAS 169 A.
Make sure the Latex has been thoroughly mixed before.

- Run a blank cycle to check the cleanliness of the instrument.

- Enter the 4 - WBC ADJUST sub menu and then 1 - WBC ADJUST

- Present the vial of Latex to the open probe as shown on diagram 3 and press the sampling bar located behind the sampling needle : an analysis cycle begins.

During the cycle measuring phasis (around 1 minute) the **Lymphocyte** and the **Granulocyte** volumes are displayed on the screen every 3 seconds as shown below :

Diag.3

LYM <57 +/- 1>	GRA <180 +/- 2>
57	180

- Wait for several results to be displayed and check the stability of both values.

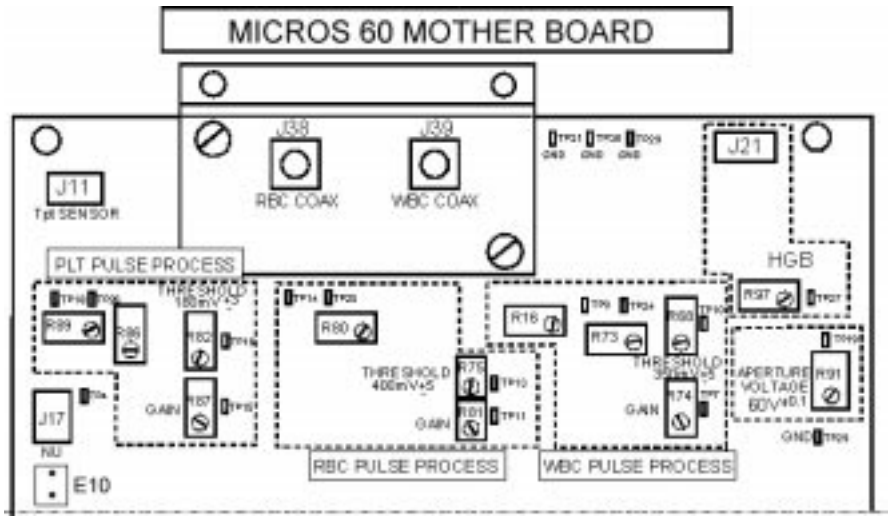
IMPORTANT

It is mandatory not to operate the gain adjustment as long as the lympho and granulo values are not stable.

After one minute the last volume values displayed on the screen are printed out as well as the WBC, PLT and RBC histograms and the CBC's results. Check that these printed values correspond to the following target values :

- **LYM = 57 ± 1**
- **GRA = 180 ± 2**

- If not rerun a «WBC ADJUST» cycle after having previously mixed the latex vial again. By means of **R74** (see diagram 4) adjust the volumes to the target values during the measuring phasis.



Diag.4

NOTE

Both sub menus 2 - # LYM < > and 3 - # GRA < > allow the technician to change the Latex target values if the latex run on the instrument different from the Latex recommended above.

5 - RBC PLT adjust

- Put the RBC and PLT latex to mix on a Vortex during 1min or shake thoroughly

IMPORTANT

As the RBC/PLT gain is a factory adjustment it is mandatory not to readjust it without taking the following precautions :
Carry out previously an autoconcentrated cleaning to make sure of the cleanliness of the RBC/PLT counting circuit.
If necessary clean the RBC/PLT chamber aperture as described in the procedure RAS 169 A.
Make sure the Latex has been thoroughly mixed before.

- Run a blank cycle to check the cleanliness of the instrument.

- Enter the «5 - RBC PLT ADJUST» sub menu.

- Present the vial of Latex to the open probe as shown on diagram 3 and press the sampling bar located behind the sampling needle : the needle directly delivers the latex sample in the RBC chamber dilution and a measuring phasis begins.

- During the cycle measuring phasis (around 1 minute) the **Platelet** and the **Red Blood cell** volumes are displayed on the screen every 3 seconds as shown below :

RBC <74 +/- 1>	PLT <59 +/-1>
74	59

- Wait for several results to be displayed and check the stability of both values.

IMPORTANT

It is mandatory not to operate the gain adjustment as long as the platelet and RBC values are not stable.

After one minute the last volume values displayed on the screen are printed out as well as the PLT and RBC histograms and the CBC's results.

- Check that these printed values correspond to the following target values :

- RBC = 74 ± 1
- PLT = 59 ± 1

NOTE

From the latex **lot # 980311** included, balls having a different size, a drift of MPV peak has been noticed, i.e. a modification of the PLT gain target value : it becomes **64** instead of **59**.
The program default value will be modified in the next MICROS version.
Both sub menus 2 - MCV < > and 3 - MPV < > allow the technician to change the Latex target values. If the lot # ≥ 980311, modify the target values and proceed the same way to adjust the PLT gain.

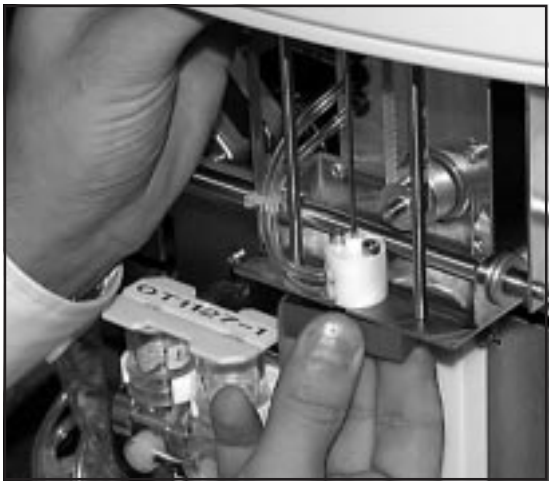
- If not, rerun a «RBC PLT ADJUST» cycle after having previously mixed the latex vial again.

- Adjust the volumes to the target values during the measuring phasis by means of the following potentiometers (see Diagram 4) :

- RBC gain with R81
- PLT gain with R87

6 - Needle sensor adjust

If the needle detector has been replaced by a new one or dismantled for any reason, it is mandatory to re-position it at the right heigth. Proceed as following :



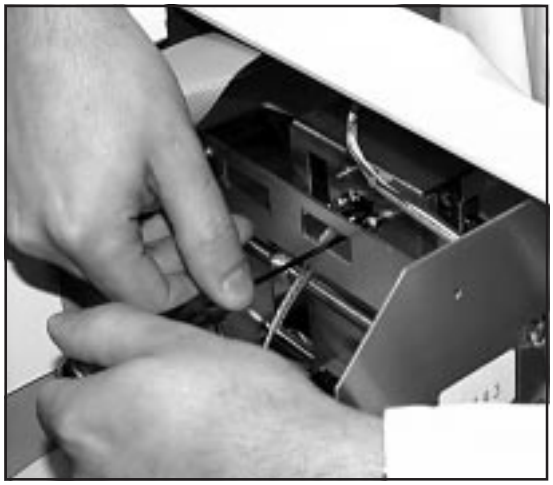
Diag.5

- Install the piece of plastic (diagram 5) underneath the needle rinsing block.

- Once entering the menu «6 - SENSOR ADJUST», enter the sub menu «1 - NEEDLE SENSOR».
- Push the sampling needle downward until it stops against the piece of plastic and press any key in order to raise the needle back in its upper position.

The current number of steps, the mini and maxi values are displayed as well as the way to move the sensor (shown by an arrow) if the current value is out of ranges (see below).

CURRENT : 62	**MIN : 65**	**MAX : 75**	▲



Diag.6

- For a current number of steps out of ranges, unloosen the 2 cell fixation screws (diagram 6) and gently move the sensor
  - upward if the current value is too low
  - downward if the current value is too high.

- Tighten the screws and rerun a «NEEDLE SENSOR» cycle. Check that the current value is correct.

NOTE 10 steps correspond to around 1 mm. The target number of steps is 70 ± 5

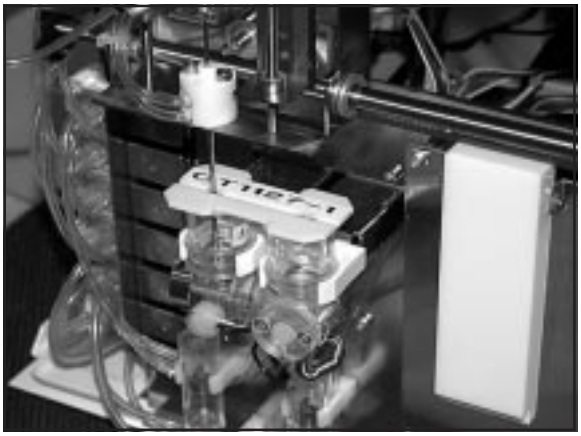
7 - Position adjustment

• Needle heigth adjustment

When replacing a needle, it is mandatory to adjust the heigth of the needle in the chambers. Proceed as follows :

- Remove the WBC/HGB chamber cover.
- Enter the menu 7 - POSITION ADJUST / 1 - NEEDLE / 2 - ADJUSTMENT.
- Manually pull down the needle until it comes into contact with the edge of the RBC chamber (Diag. 7).
- Press a key to continue : the needle moves up to the initial position ; the value is stored.

Diag.7



Diag.8

• Needle motion adjustment

The needle position in the WBC chamber can be adjusted as follows :

- Enter the menu 7 - POSITION ADJUST / 2 - CARRIAGE / 2 - ADJUSTMENT.
- Position the tool (P/N : GBC 218 A) over the RBC and WBC chambers (Diag 8).
- Manually lower the needle into the WBC chamber.
- Press a key to continue : the needle moves up, and the carriage comes back to the initial position ; the value is stored.
- Carry out a 3 - CHECK cycle : the needle comes down to the WBC chamber.
- Check that the needle is centered in the hole.

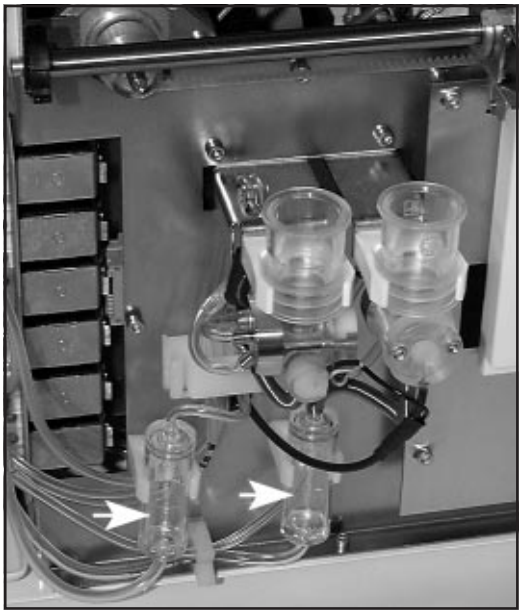
If not, enter the 2 - CARRIAGE / 1 - CARRIAGE < > menu ; the display shows the current number of steps carriage motion.
If the needle goes too far on the right, add 1 step to the current value for 0.1mm.
If the needle is too much on the left, decrease the current value of 1 step for 0.1mm.

CARRIAGE ? :	**EXIT : ESC**
CURRENT : 893	**SAVE : ENTER**

Carry out a 2 - CARRIAGE / 3 - CHECK cycle again to control the needle position.

8 - Bubbling adjustment

An overflow protection tank is installed on the drain circuit of each chamber. This one prevents from polluted liquid overflow during bubbling phasis (Diag .9).



Diag.9

Two bubbling phasis are adjustable :

- "BUBBLING 1" is the first dilution (WBC/HGB chamber) bubbling value.
- "BUBBLING 2" is the second dilution (WBC/HGB chamber + lyse) value and RBC chamber bubbling value.

Both values correspond to a number of steps carried out by the waste/vacuum syringe.

Default values are BUBBLING 1 : 175
BUBBLING 2 : 120

CAUTION

These values are factory adjusted (and may be different from the default values shown above) and should be modified only when hematologic erroneous results are given by the instument : If values are too important, liquid overflows can occur or if bubbling is too low homogeneity of the dilution can be decreased.

Ranges : 150 < BUBBLING 1 < 200
80 < BUBBLING 2 < 140

To modify the bubbling values, enter the menu :

2 - ADJUSTMENTS / 8 - BUBBLING ADJUST. / BUBBLING 1 < >
2 - ADJUSTMENTS / 8 - BUBBLING ADJUST. / BUBBLING 2 < >

and type in new step value.

Carry out a 3 - CHECK to control the adjustment.

III - Temperature

When entering the «temperature adjustment» menu the following sub menus are displayed :

1 - Uncal. temperature

When pressing the Enter key the sensor temperature value **uncalibrated** is displayed. This value should be close to the diluent temperature.

2 - Calibrate :

The temperature must be calibrated according to the diluent temperature :

- Plunge a thermometer directly into the diluent container and leave it for a while until stabilization.

NOTE For a pack equipped instrument, the thermometer must be plunged in the WBC/HGB chamber and the temperature must be note as soon as possible.

- Run 2 diluent primes («SERVICE» menu, «PRIME» sub menu, «DILUENT» selection).

- Enter the «CALIBRATE» menu. Note the temperature of the diluent and type in the value (if it is different from the previous on the instrument).

- Press Enter to save the new value.

3 - Temperature :

1 - Visible : Press Enter to validate the temperature display.
The value displayed is the calibrated temperature.

2 - Invisible : Press Enter to cancel the temperature display.
(Temperature invisible by default)

IV - Run mode

The instrument must be configurated in the «USER» mode (configurated by default in the «USER « mode), the «CONTROL» mode intends for a factory use.

V - Reagent pack

This function is used to update the instrument from a bottle mode to a pack mode.

VI - Serial #

Displays the instrument serial number.

VII - Cycle #

Displays the : Startup number since the first use of the instrument.
Stand by number since the first use of the instrument.
CBC number since the first use of the instrument.

IMPORTANT

The startup, stand by and CBC numbers are adjustable in this menu but it is mandatory to keep the initial values (useful for maintenance schedules).

VIII - Burn-in

This function which allows the burn-in of the instrument is intended for a factory use.

MECHANIC FUNCTION

MICROS 60

Hématologie

08/04/98

• CONCERNS

- Sensor replacements
- Needle motion check
- Carriage motion check
- Liquid syringe motion check
- Vacuum/waste syringe motion check
- Valve operation check
- LCD contrast adjustment
- Piercing mechanism check (***MICROS 60 CT***)

• REQUIRED TOOLS

- Hexagonal keys
- Felt-pen

• REQUIRED PRODUCTS

- None

• INTERVENTION TIME

- 30 minutes

• FREQUENCY

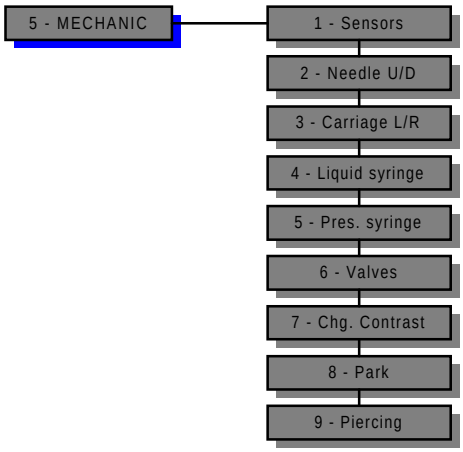
- See maintenance chart table.

• SPECIFIC KIT OR CONSUMABLES

- Vacuum/waste syringe sensor : XBA 319 AS
- Liquid syringe sensor : XBA 319 AS
- Carriage and needle sensors : XBA 250 A

• PROCEDURE

The MECHANIC function arborescence is as follows :



From the main menu, enter the 4 - SERVICE menu and move to 5 - MECHANIC sub menu.

1 - Sensors

Press

;

NEEDLE SENSOR	**0**
CARRIAGE SENSOR	**0**

should be displayed on the LCD screen.

Manually raise the needle support in the upper position (see diag 1)
The «0» should switch to «1». This indicates the correct operation of the needle sensor (diagram 1).
If nothing happened try to move the needle up and down again to get the commutation from «0» to «1».
If the test is still wrong, check the correct connection of the sensor on the connector J7 of the mother board.

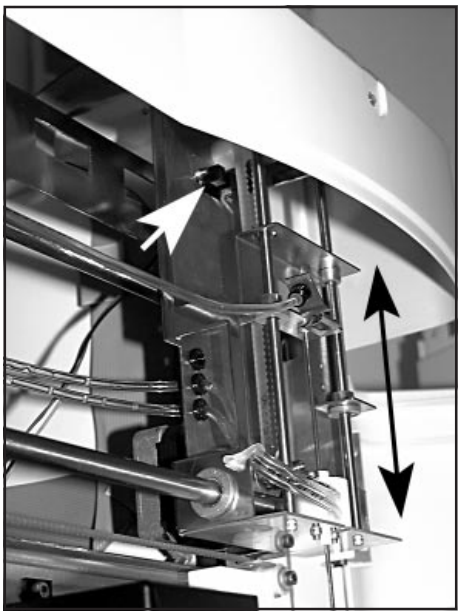
• Replacing the needle sensor
Switch off the instrument.
Use a felt-pen to mark the sensor position.
Unscrew the 2 sensor fixation screws and remove the cell holder .
Disconnect the wire from the J7 connector (See diagram 2).
Replace the previous sensor by a new one and reassemble in the reverse order.

CAUTION

The new sensor must be installed exactly on the same position.

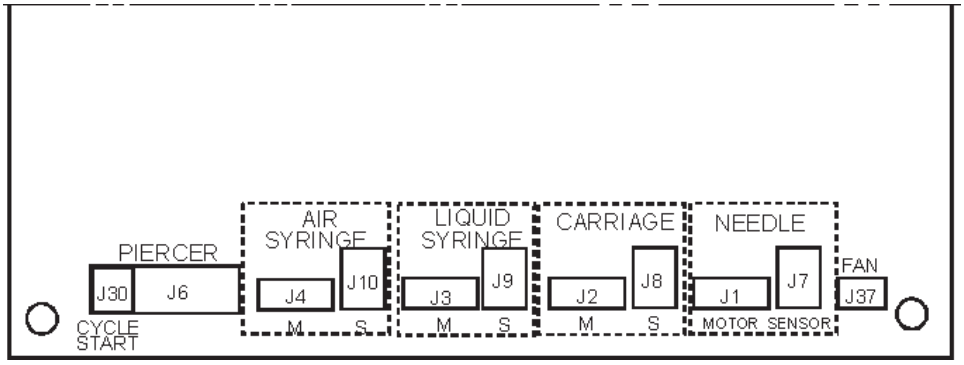
Proceed as described in **RAS 172 A (MICROS 60 *OT*)** or **RAS 176 A (MICROS 60 *CT*)** «Sensor adjustment» to check the correct position of the sensor.

MICROS 60 OT



MCROS 60 CT

Diag.1



Diag.2

• **Replacing the carriage sensor**

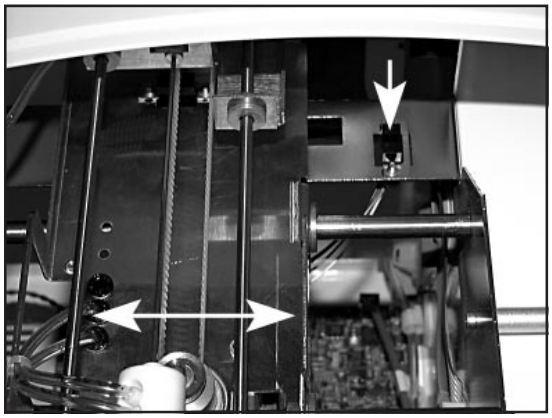
Use the 1 - SENSOR test to check the carriage motion detection :
Move rightward the needle carriage in order to perform the sensor detection (diagram 3).
To replace it, note its position with a felt-pen, unscrew the cell fixation screws and remove the cell holder.
Disconnect the wire from the connector J8 (See diagram 2)
Replace the previous sensor by a new one and reassemble in the reverse order.

CAUTION

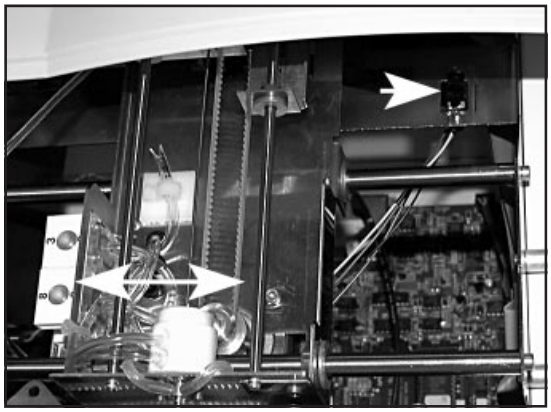
The new sensor must be installed exactly on the same position.

Proceed as described in **RAS 172 A (MICROS 60 *OT*)** or **RAS 176 A (MICROS 60 *CT*)** «Sensor adjustment» to check the correct position of the sensor.

MICROS 60 OT



MICROS 60 CT



Diag.3

2 - Liquid syringes motion check

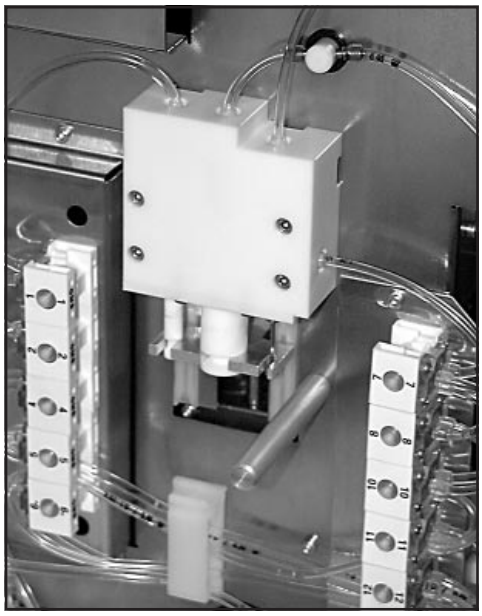
Run a 4 - LIQUID SYRINGE cycle : The syringes (diag 4) are moved upward and downward once.

If the sensor (diag 5) detection is not correct a message «ERROR : SYRINGE MOTOR» is displayed.

Three parts are involved :

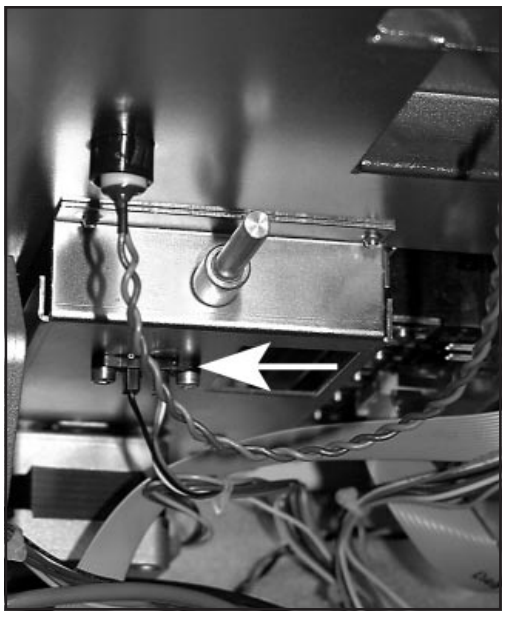
- The motor ———> Check the connection on the board (connector J3)
- The syringes ———> Check the motion up/down
- The sensor ———> Check the connection on the board or replace it.

SYRINGE FRONT SIDE VIEW



Diag.4

SYRINGE BACK SIDE VIEW



Diag.5

• **Replacing the sensor** :

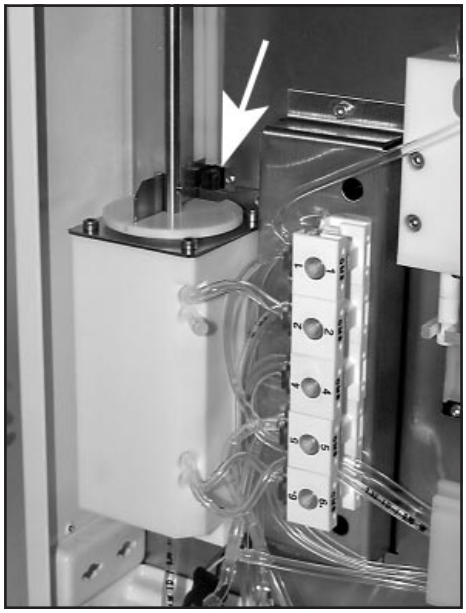
- Switch off the instrument.
- Unscrew the 2 screws (Diag.5) and disconnect the wire from the connector J9 (Diag.2)
- Replace the previous sensor by a new one and re-install in the reverse order.
- Switch on the instrument.
- Run a 4 - LIQUID SYRINGE cycle again to control the correct detection.

3 - Vacuum/waste syringe motion check

Run a 5 - PRESSURE SYRINGE cycle : The syringe piston moves upward and downward once.
If the sensor (Diag.6) detection is not correct a message «ERROR : PRESSURE SYRINGE MOTOR» is displayed.

Three parts are involved :

- The motor ———> Check the connection on the board (connector J4)
- The syringe ———> Check the motion up/down
- The sensor ———> Check the connection on the board or replace it.



Diag.6

• Replacing the sensor :

- Switch off the instrument.

- Unscrew the 2 cell fixation screws (Diag.6) and disconnect the wire from the connector J10 (Diag.2)
- Replace the previous sensor by a new one and re-install in the reverse order.
- Switch on the instrument.
- Run a 5 - PRESSURE SYRINGE cycle again to control the correct detection.

4 - Valve operation check

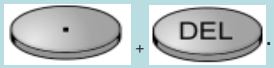
Run a 6 - VALVES cycle. The number of the valves from 1 to 13 is displayed and each valve is activated once.
Check their correct operations. If a valve is suspected proceed as described in the procedure : RAS 170 A.

5 - LCD contrast adjustment

Enter the sub menu «7 - CHG. CONTRAST». Use the arrows to modify the contrast and press

to validate the adjustment.

NOTE

If the LCD screen happens to be unreadable because of a bad contrast adjustment it is possible to get back a correct contrast pressing at the same time both keys : 

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6 - Piercing mechanism check (MICROS 60 CT)

Enter the sub menu 9 - PIERCING. Follow the instructions : «PLEASE CLOSE TUBE HOLDER DOOR» : a piercing operation is simulated.

This function gives the sample tube holder position and the heigth of the needle in its lower position. See **RAS 172 A (MICROS 60 *OT*)** or **RAS 176 A (MICROS 60 *CT*)**

NOTE

If the sample tube holder has been removed the following message is displayed : «ERROR : NO SAMPLE TUBE HOLDER».
If the sample tube holder has been turned in between two piercing positions (it means that the tube is not in front of the piercing needle) the following message is displayed : «ERROR : TUBE HOLDER POSITION».

DRAIN DETECTION

MICROS 60

Hématologie

05/10/98

• CONCERNS

- Drain detection sensor adjustment/replacement

• REQUIRED TOOLS

- Voltmeter
- Flat screw driver
- 5ml syringe

• REQUIRED PRODUCTS

- None

• INTERVENTION TIME

- 15 min

• FREQUENCY

- On request or once a year

• SPECIFIC KIT OR CONSUMABLES

- Drain detection sensor : XBA 199 A.

DRAIN DETECTION

• PROCEDURE

The Vacuum/Waste syringe and the chambers drains are controled by an infrared sensor located below the syringe.

Controls carried out by the cell during a cycle are as follows :

- *Control of the correct operation of the cell*

At the first chamber drain, air must be detected in the cell within defined timeout, and followed by liquids.
If this switch "air-liquid" has been successfull, the adjustment of the cell (see below) is validated.
If not, the cycle is stopped and the following message is triggered : *"sensor error or diluent empty*" (check the connection or the adjustment of the cell).

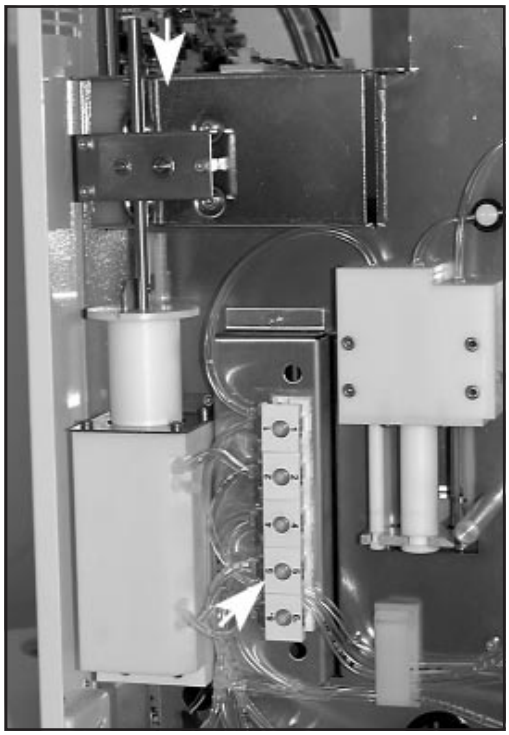
- *Control of the chamber drains*

A first measure controls that liquids circulate in the cell during a defined timeout.
The second measure checks that air has replaced liquid.
If so, the drain phasis is validated.

If not, the following message is displayed : «.....» (the instrument carries on the current cycle)
It means that the sensor always detects liquids.
(Check the watertightness of the syringe.)

• Drain detection sensor adjustment

- Raise the piston up and press the valve <2>.
- Manually perform a syringe drain pressing the valve <5> and pulling down the syringe piston (Diag.1).



Diag.1

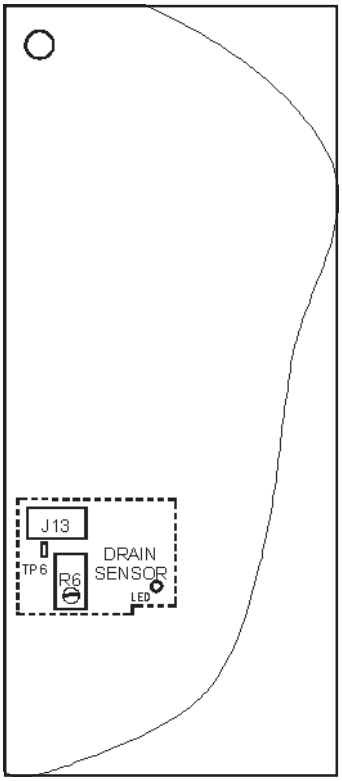
- Make sure the cell is perfectly drained (no bubble).

- Connect a voltmeter between the ground **TP30** and **TP6** (See Diag.2) and adjust the voltage to **4,5V ± 0,3V** by means of **R6.**

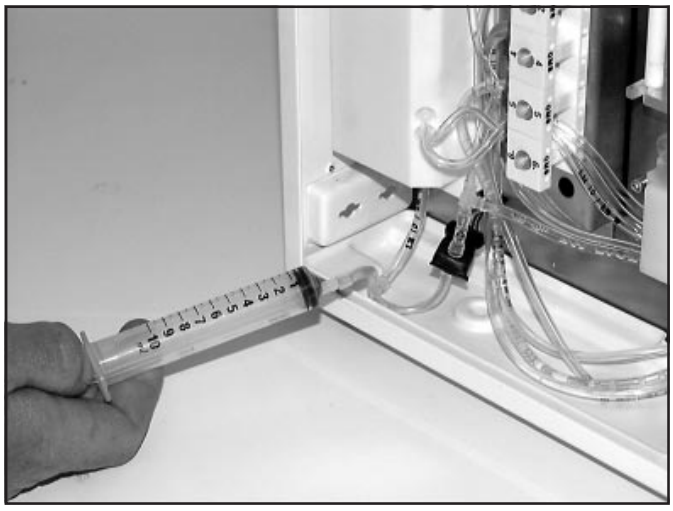
DRAIN DETECTION

Fill the syringe up with diluent and connect it on the detection cell as shown on diagram 3.

MICROS 60 MOTHER BOARD



Diag.2



Diag.3

- Push diluent through the sensor and check that the voltage falls down below **1Volt** on the voltmeter.

NOTE

Check the commutation from 4,5Volts to ≃ 0Volt once again pushing and drawning alternately liquid and air through the sensor by means of the syringe.

- If nothing happens switch off the instrument and disconnect the connector from J13.
- Replace the drain detection sensor by a new one.
- Switch on the instrument
- Carry out the new sensor adjustment as described above.

NOTE

However it is posible to control the correct operation of the sensor by means of the LED located next to **R6**.
Indeed the LED should be lit when liquid circulates through the sensor and switched off with air.

MICROS 60

PCB VOLTAGE CHECKS/ ADJUSTMENTS

Hématologie

01/10/98

• CONCERNS

- Voltage supply check
- Aperture voltage check
- RBC threshold check/adjustment
- WBC threshold check/adjustment
- PLT threshold check/adjustment
- HGB blank voltage check.
- Stepper motor voltages adjustment

• REQUIRED TOOLS

- Voltmeter
- Flat screw driver

• REQUIRED PRODUCTS

- None

• INTERVENTION TIME

- 20min

• FREQUENCY

- See maintenance chart table.

• SPECIFIC KIT OR CONSUMABLES

- None

• PROCEDURE

1 - RBC, PLT, WBC threshold checks/adjustments

- Ground on TP31.
- Adjust the thresholds according to the below chart table :

THRESHOLDS	TEST POINTS	VOLTAGE	POTENTIOMETERS
WBC	TP 10	350 mV ± 7	R68
RBC	TP13	400 mV ± 7	R75
PLT	TP16	180 mV ± 3	R82

(See Diag.1)

2 - Aperture voltage check

See RAS 172 A : **MICROS 60 *OT*** Technician function
RAS 176 A : **MICROS 60 *CT*** Technician function

3 - Voltage supply check

See RAS 171 A

4 - HGB blank voltage check

See RAS 172 A : **MICROS 60 *OT*** Technician function
RAS 176 A : **MICROS 60 *CT*** Technician function

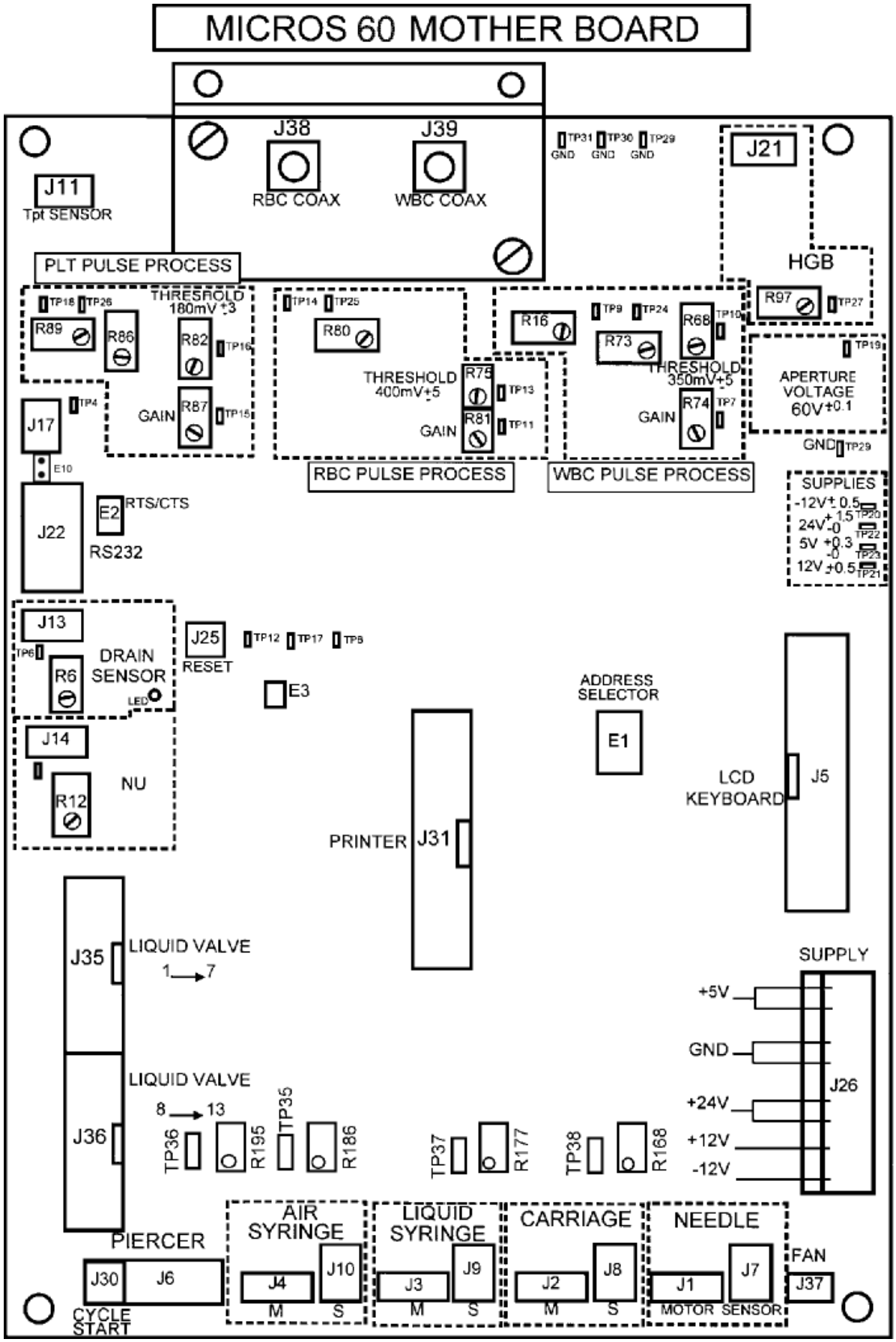
5 - Stepper motor voltage checks/adjustments

- Ground on TP31.
- Adjust the motor voltages according to the below chart table :

MOTORS	TEST POINTS	VOLTAGES	POTENTIOMETERS
Air syringe	TP36	2.50 V ± 0.05 V	R195
Liquid syringe	TP35	2.00 V ± 0.05 V	R186
Horizontal carriage	TP37	1.50 V ± 0.05 V	R177
Vertical carriage	TP38	1.00 V ± 0.05 V	R168

(See Diag.1)

PCB VOLTAGE CHECKS/ADJUSTMENTS



Diag.1

MICROS 60 CT

Hématologie

16/06/98

• CONCERNS

1 - Version display.
2 - Adjustments :
HGB photometer calibration, Aperture voltage
Vacuum check, WBC gain, RBC & PLT gain
Sensor, Needle heigth, Needle motion
Bubbling
3 - Temperature sensor adjustment
4 - Run mode
5 - Reagent pack
6 - Serial number
7 - Cycle number
8 - Burn-in

• REQUIRED TOOLS

- Flat screw driver
- thermometer
- Barflex
- Hexagonal keys
- Voltmeter

• REQUIRED PRODUCTS

- WBC latex : LAD 001 AS
- RBC and PLT latex : LAD 002 AS
- Soft paper
- Flat piece of stiff plastic

• INTERVENTION TIME

- 60 min

• FREQUENCY

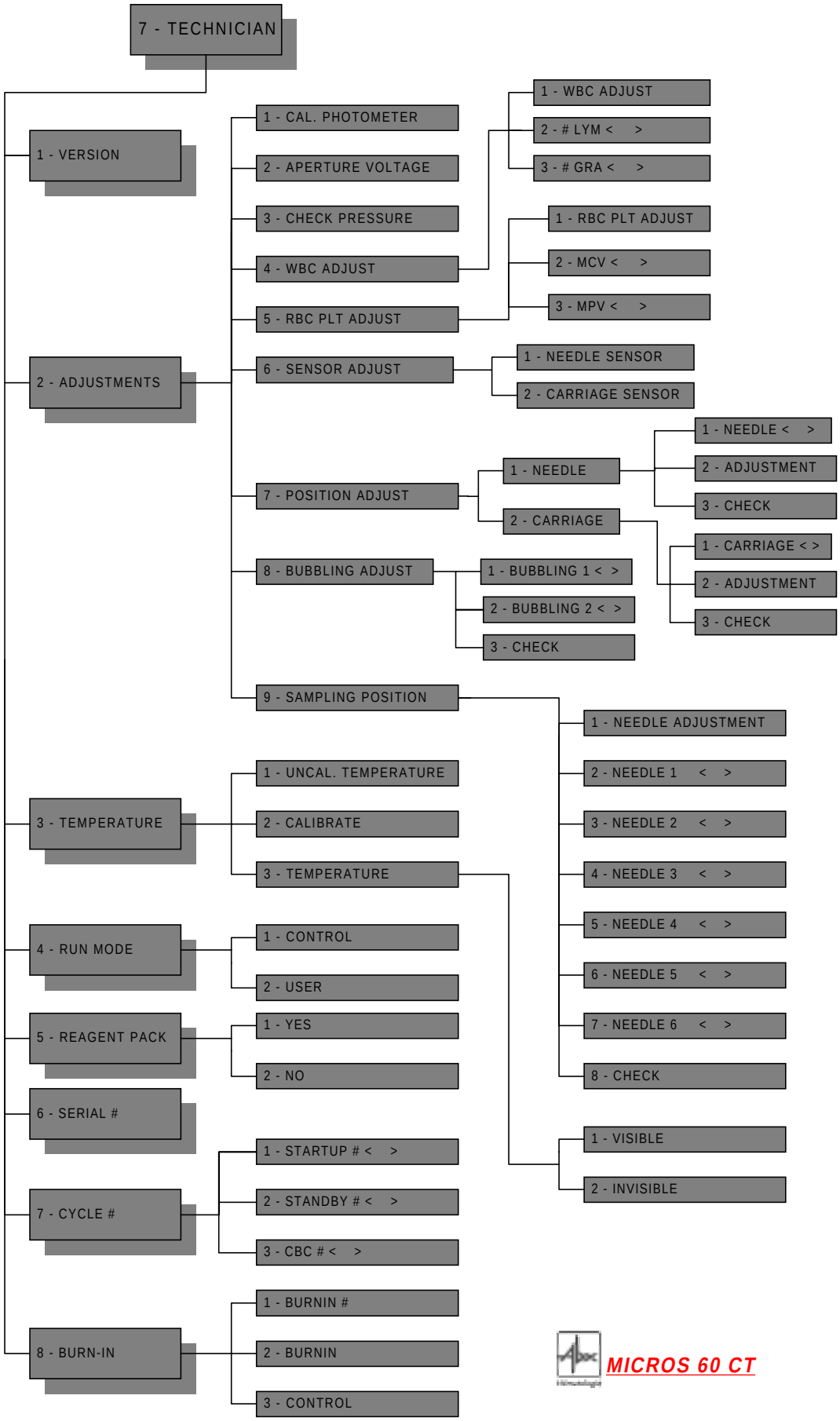
- See maintenance chart table.

• SPECIFIC KIT OR CONSUMABLES

- None

TECHNICIAN FUNCTION

- PROCEDURE



TECHNICIAN FUNCTION

Once entering the «SERVICE» sub menu, move to «TECHNICIAN FUNCTIONS» and press

. A specific password (421) is required to enter the sub menus.

Move the cursor by means of and and choose the required menus pressing the

key.

I - The version number is displayed.

II - Adjustments :

1 - HGB photometer calibration

- Dismantle the WBC/HGB chamber cover.

- Check the general cleanliness of the WBC chamber/spectrophotometer assy.

- Re-install the chamber cover.

NOTE

If the WBC/HGB chamber has been dismantled previously make sure no liquid has flown in between the spectrophotomer and the chamber.
Clean the inner surfaces of the spectrophotometer as well as the chamber.
Reassemble the assy and tighten the two screws to the following torque : 400mN.m (see RAS 169 A : Chamber maintenance)

- Run the CAL PHOTOMETER function (selection 1 of the «ADJUSTMENTS» menu) : diluent is delivered to the WBC/HGB chamber twice.

An HGB channel is displayed on the LCD screen :

VALUE XXX

IMPORTANT

1 - The HGB photometer calibration must be done 20min at least after the instrument has been switched on.
2 - This adjustment must be done with the WBC chamber cover installed!!!

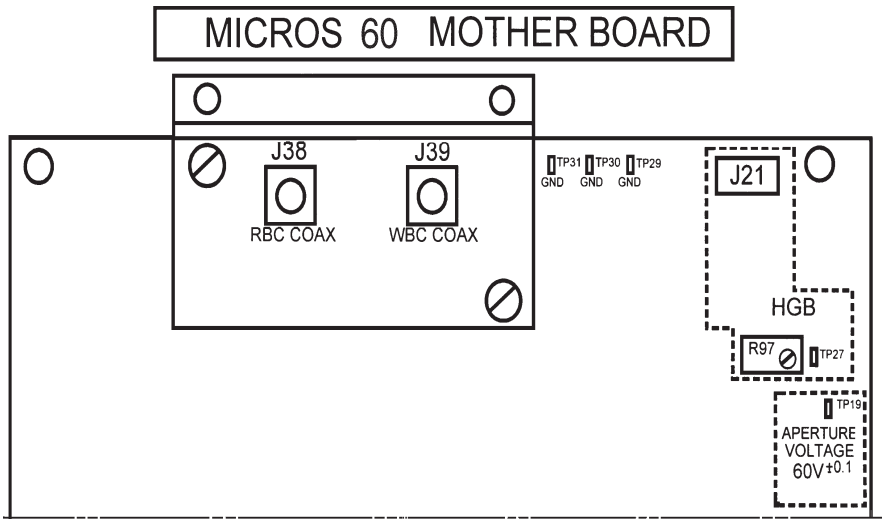
- By means of **R97** (See diagram 1) adjust the HGB channel according to the room temperature using the chart table given on next page.

NOTE

After 40 seconds approximately, the function is automatically exited.

- Run the CAL PHOTOMETER function again to verify the adjustment.

MICROS 60 CT



Diag.1

ROOM TPT (°C)	CHANNEL		
	Mini.	Nominal	Maxi.
15	240	245	250
16	240	245	250
17	239	244	249
18	238	243	248
19	237	242	247
20	236	241	246
21	235	240	245
22	234	239	244
23	234	239	244
24	233	238	243
25	232	237	242
26	231	236	241
27	230	235	240
28	229	234	239
29	228	233	238
30	228	233	238
31	227	232	237
32	226	231	236
33	225	230	235
34	224	229	234
35	223	228	233

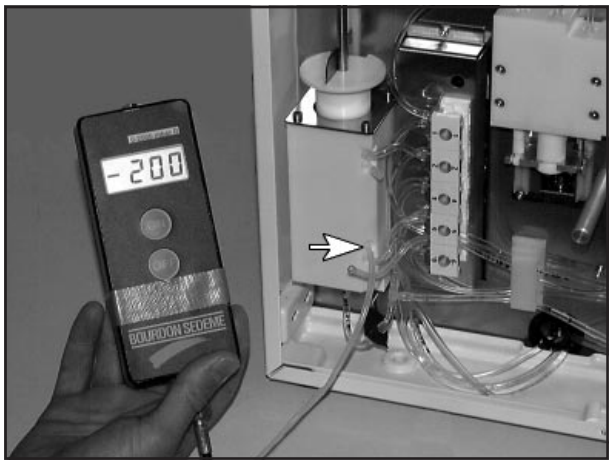
2 - Aperture voltage

- Once entering the «APERTURE VOLTAGE» menu, connect a voltmeter between the ground (TP30) and TP19.

- Check that the value is **60V +2.8V -1.5V** (Diagram 1). The aperture voltage is not adjustable.

- Press any key to escape.

3 - Vacuum check



Diag.2

- Disconnect the tube from the vacuum/ waste syringe coming from the valve (see diagram 2).

- Follow the instructions given on the LCD screen :

«PLEASE PLUG BARFLEX ON AIR SYRINGE» (On the free nipple).

«CHECK PRESSURE : -200mB ± 10mB» (The piston has raised in order to create a vacuum in the syringe body).

- Check the stability of the vacuum during 30 secondes : The vacuum drop down must be ≤ 2 mbar.

- If the results are not correct check the O ring and the tubing watertightness.

«PLEASE RECONNECT PREVIOUS TUBE» (disconnect the Barflex and replug the tube instead).

4 - WBC adjust

- Put the WBC latex to mix on a Vortex during 1min or shake thoroughly

IMPORTANT

As the WBC gain is a factory adjustment it is mandatory not to readjust it without taking the following precautions :
Carry out previously an autoconcentrated cleaning to make sure of the cleanliness of the WBC counting circuit.
If necessary clean the WBC chamber aperture as described in RAS 169 A.
Make sure the Latex has been thoroughly mixed before.

- Run a blank cycle to check the cleanliness of the instrument.

- Enter the «WBC ADJUST» sub menu.

Diag.3

- Enter the «WBC ADJUST» sub menu and close the door of the piercing mechanism (See Diag 3) : A CBC's cycle starts.

During the cycle measuring phasis (around 1 minute) the **Lymphocyte** and the **Granulocyte** volumes are displayed on the screen every 3 seconds as shown below :

LYM <57 +/- 1>	GRA <180 +/- 2>
57	180

- Wait for several results to be displayed and check the stability of both values.

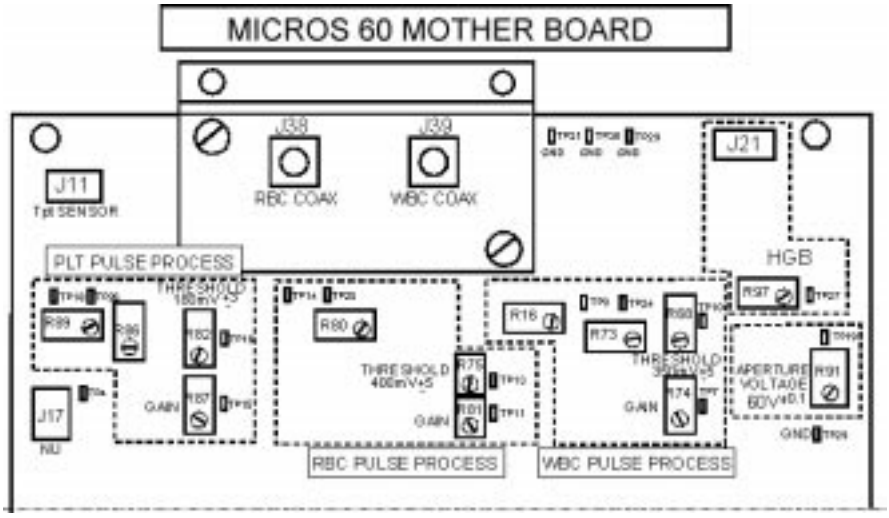
IMPORTANT

It is mandatory not to operate the gain adjustment as long as the lympho and granulo values are not stable.

After one minute the last volume values displayed on the screen are printed out as well as the WBC, PLT and RBC histograms and the CBC's results. Check that these printed values correspond to the following target values :

- **LYM = 57 ± 1**
- **GRA = 180 ± 2**

- If not rerun a «WBC ADJUST» cycle after having previously mixed the latex vial again. By means of **R74** (see diagram 4) adjust the volumes to the target values during the measuring phasis.



Diag.4

NOTE

Both sub menus 2 - # LYM < > and 3 - # GRA < > allow the technician to change the Latex target values if the latex run on the instrument is different from the one recommended above.

5 - RBC PLT adjust

- Put the RBC and PLT latex to mix on a Vortex during 1min or shake thoroughly

IMPORTANT

As the RBC/PLT gain is a factory adjustment it is mandatory not to readjust it without taking the following precautions :
Carry out previously an autoconcentrated cleaning to make sure of the cleanliness of the RBC/PLT counting circuit.
If necessary clean the RBC/PLT chamber aperture as described in the procedure RAS 169 A.
Make sure the Latex has been thoroughly mixed before.

- Run a blank cycle to check the cleanliness of the instrument.

- Enter the «RBC PLT ADJUST» sub menu.

- Present the vial of Latex to the open probe as shown on diagram 3 and press the sampling bar located behind the sampling needle : the needle directly delivers the latex sample in the RBC chamber dilution (for a usual analysis cycle the sample is first delivers to the mixing chamber) and a measuring phasis begins.

- During the cycle measuring phasis (around 1 minute) the **Platelet** and the **Red Blood cell** volumes are displayed on the screen every 3 seconds as shown below :

RBC <74 +/- 1>	PLT <59 +/-1>
74	59

- Wait for several results to be displayed and check the stability of both values.

IMPORTANT

It is mandatory not to operate the gain adjustment as long as the platelet and RBC values are not stable.

NOTE

From the latex **lot # 980311** included, balls having a different size, a drift of MPV peak has been noticed, i.e. a modification of the PLT gain target value : it becomes **64** instead of **59**.
The program default value will be modified in the next MICROS version.
Both sub menus 2 - MCV < > and 3 - MPV < > allow the technician to change the Latex target values. If the lot # $\geq$ 980311, modify the target values and proceed the same way to adjust the PLT gain.

- If not, rerun a «RBC PLT ADJUST» cycle after having previously mixed the latex vial again.

- Adjust the volumes to the target values during the measuring phasis by means of the following potentiometers (see Diagram 4) :

- RBC gain with R81
- PLT gain with R87

6 - Sensor adjust

• Needle sensor

If the needle sensor (diag 6) has been replaced by a new one or dismantled for any reason, it is mandatory to re-position it at the right heigth. Proceed as following :

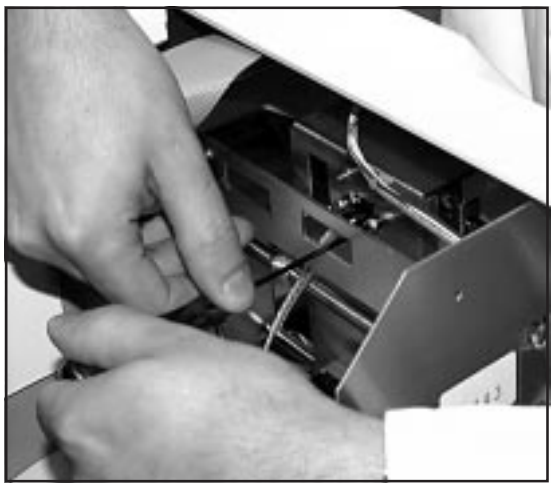
Diag.5

- Install the piece of plastic (diagram 5) underneath the needle rinsing block.

- Once entering the menu «SENSOR ADJUST», enter the sub menu «NEEDLE SENSOR».
- Push the sampling needle downward until it stops against the piece of plastic and press any key in order to raise the needle back in its upper position.

The current number of steps, the mini and maxi values are displayed as well as the way to remove the sensor (shown by an arrow) if the current value is out of ranges (see below).

CURRENT : XXX	MIN : 422	MAX : 432	▲



Diag.6

- For a current number of steps out of ranges, unloosen the 2 cell fixation screws (diagram 6) and gently move the sensor
  - upward if the current value is too low
  - downward if the current value is too high.

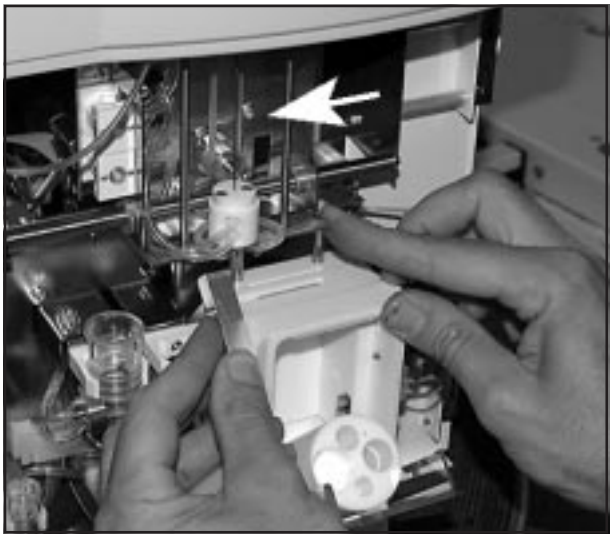
- Tighten the screws and rerun a «NEEDLE SENSOR» cycle. Check that the current value is correct.

NOTE 10 steps correspond to around 1 mm. The target number of steps is 70 ± 5

• Carriage sensor

This function allows the adjustment of the carriage sensor (diagram 8) position.

- Proceed as described below :



Diag.7

- Install the piece of plastic against the left side of the tube holder compartment (see Diagram 7).
- Once entering the menu «SENSOR ADJUST» (Selection 6), enter the sub menu «CARRIAGE SENSOR».

Move the carriage on the left until the piercing needle stops against the piece of plastic. Press any key : the carriage comes back in its initial position.

The current number of steps, the mini and maxi values are displayed as well as the way to remove the sensor if the current value is out of ranges (see below).

CURRENT : 340	**MIN : 345**	**MAX : 355**	▶

Diag.8

- For a current number of steps out of ranges, unloosen the 2 screws (see diagram 8) and gently move the sensor

- towards the right if the current value is too low
- towards the left if the current value is too high.

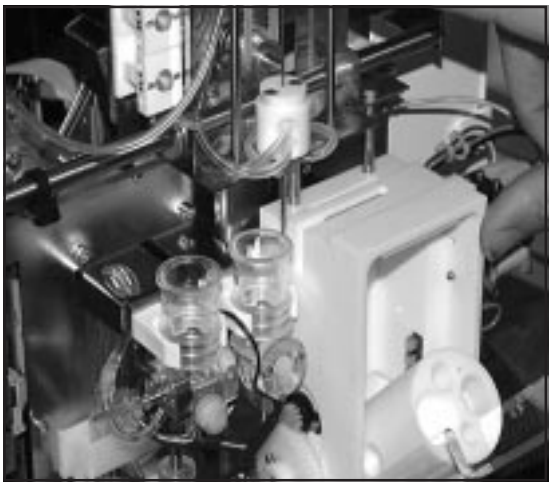
NOTE 10 steps correspond to around 1 mm. The target number of steps is 350 ± 5

- Tighten the screws (see diagram 8) and rerun a «CARRIAGE» cycle. Check that the current value is correct.

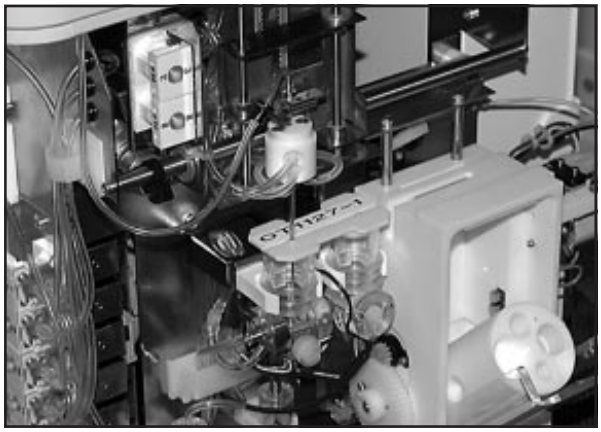
7 - Position adjustment

• Needle heigth adjustment

When replacing a needle, it is mandatory to adjust the heigth of the needle in the chambers.
Proceed as follows :
- Remove the WBC/HGB chamber cover.
- Enter the menu 7 - POSITION ADJUST / 1 - NEEDLE / 2 - ADJUSTMENT.
- Manually pull down the needle until it comes into contact with the edge of the RBC chamber (Diag. 9).
- Press a key to continue : the needle moves up to the initial position ; the value is stored.



Diag.9



Diag.10

• Needle motion adjustment

The needle position in the WBC chamber can be adjusted as follows :

- Enter the menu 7 - POSITION ADJUST / 2 - CARRIAGE / 2 - ADJUSTMENT.
- Position the tool (P/N : GBC 218 A) over the RBC and WBC chambers (Diag 10).
- Manually lower the needle into the WBC chamber.
- Press a key to continue : the needle moves up, and the carriage comes back to the initial position ; the value is stored.
- Carry out a 3 - CHECK cycle : the needle comes down to the WBC chamber.
- Check that the needle is centered in the hole.

If not, enter the 2 - CARRIAGE / 1 - CARRIAGE < > menu ; the display shows the current number of steps carriage motion.
If the needle goes too far on the right, add 1 step to the current value for 0.1mm.
If the needle is too much on the left, decrease the current value of 1 step for 0.1mm.

CARRIAGE ? :	**EXIT : ESC**
CURRENT : 893	**SAVE : ENTER**

Carry out a 2 - CARRIAGE / 3 - CHECK cycle again to control the needle position.

8 - Bubbling adjustment

An overflow protection tank is installed on the drain circuit of each chamber. This one prevents from polluted liquid overflow during bubbling phasis (Diag .11).

Diag.11

Two bubbling phasis are adjustable :

- "BUBBLING 1" is the first dilution (WBC/HGB chamber) bubbling value.
- "BUBBLING 2" is the second dilution (WBC/HGB chamber + LYSE) value and RBC chamber bubbling value.

Both values correspond to a number of steps carried out by the waste/vacuum syringe.
Default values are BUBBLING 1 : 175
BUBBLING 2 : 120

CAUTION

These values are factory adjusted (and may be different from the default values shown above) and should be modified only when hematologic erroneous results are given by the instument : If values are too important, liquid overflows can occur or if bubbling is too low homogeneity of the dilution can be decreased.
Ranges : 150 < BUBBLING 1 < 200
80 < BUBBLING 2 < 140

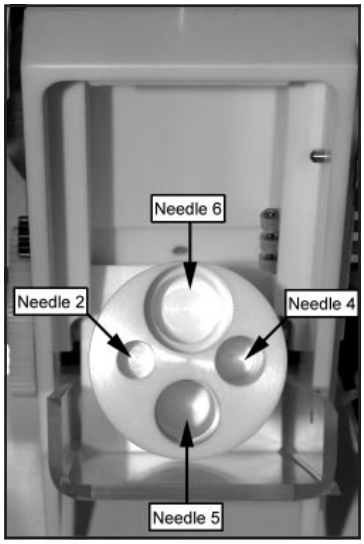
To modify the bubbling values, enter the menu :

2 - ADJUSTMENTS / 8 - BUBBLING ADJUST. / BUBBLING 1 < >
2 - ADJUSTMENTS / 8 - BUBBLING ADJUST. / BUBBLING 2 < >

and type in new step value.

Carry out a 3 - CHECK to control the adjustment.

8 - Needle sampling position



Diag.13

- Move the tube holder to one of the four sampling positions.

- Move the cursor to the function 9 - SAMPLING POSITION / 1 - NEEDLE ADJUSTMENT.

- Close the sample holder door. The sampler assy moves to the upper position (except in the *Needle 6* position).

- Manually push the sampling needle to the bottom of the required sampling position and press Enter : The **MICROS 60 *CT*** adjust automatically the needle depth whatever the tube holder position can be. The sampler assy comes back to the initial position and the sampler door is opened.

WARNING !

OEM instruments equipped with specific sample tube holders (see RAS 198 A procedure) must be used with the specific tubes or blood controls they were intended for.

- Turn the tube holder to another needle position and carries out the same procedure to adjust the needle depth.

It is possible to enter directly the required number of steps for each sampling position. Proceed as following :

Enter the sub menu that corresponds to the number of the needle : the current number of steps is displayed. Enter the new value.

Increase the number of steps to move the needle deeper or decrease the value to raise the needle.

Confirm the new value with Enter . The minimum and maximum step values are as follow :

NEEDLE	*NUMBER OF STEPS*		
	MINI.	DEFAULT	MAXI.
1	1	788	1100
2	1	661	1100
3	1	612	1100
4	1	948	1100
5	1	1003	1100
6	1	845	1100

*** Check**

The CHECK function allows to check the piercing operation on each sampling position. From the SAMPLING POSITION menu, move the cursor to the function <9> CHECK and press ENTER.
Select the required position on the tube holder and close the sample door. The piercing cycle is carried out and the number of steps for this position is displayed :

NEEDLE 2 CURRENT : 635 STANDARD : 630

III - Temperature adjustment

When entering the «temperature adjustment» menu the following sub menus are displayed :

1 - Uncal. temperature

When pressing the Enter key the sensor temperature value **uncalibrated** is displayed. This value should be close to the diluent temperature.

2 - Calibrate :

The temperature must be calibrated according to the diluent temperature :

- Plunge a thermometer directly into the diluent container and leave it for a while until stabilization.

NOTE For a pack equipped instrument, the thermometer must be plunged in the WBC/HGB chamber and the temperature must be note as soon as possible.

- Run 2 diluent primes («SERVICE» menu, «PRIME» sub menu, «DILUENT» selection).

- Enter the «CALIBRATE» menu. Note the temperature of the diluent and type in the value (if it is different from the previous on the instrument).

- Press Enter to save the new value.

3 - Temperature :

1 - Visible : Press Enter to validate the temperature display.
The value displayed is the calibrated temperature.

2 - Invisible : Press Enter to cancel the temperature display.
(Temperature invisible by default)

IV - Run mode

The instrument must be configurated in the «USER» mode (configurated by default in the «USER « mode), the «CONTROL» mode intends for a factory use.

V - Reagent pack

This function is used to update the instrument from a bottle mode to a pack mode.

MICROS 60 CT

VI - Serial #

Displays the instrument serial number.

VII - Cycle #

Displays the : Startup number since the first use of the instrument.
Stand by number since the first use of the instrument.
CBC number since the first use of the instrument.

IMPORTANT

The startup, stand by and CBC numbers are adjustable in this menu but it is mandatory to keep the initial values (useful for maintenance schedules).

VIII - Burn-in

CAUTION

This function which allows the burn-in of the instrument is intended for a factory use.

LX300 PRINTER SETUP

MICROS 60

Hématologie

01/04/98

• CONCERNS

1 - Configuration
2 - Control panel
3 - Control LEDS and keys
4 - Printer description

• REQUIRED TOOLS

- None

• REQUIRED PRODUCTS

- None

• INTERVENTION TIME

- 15 minutes

• FREQUENCY

- On request

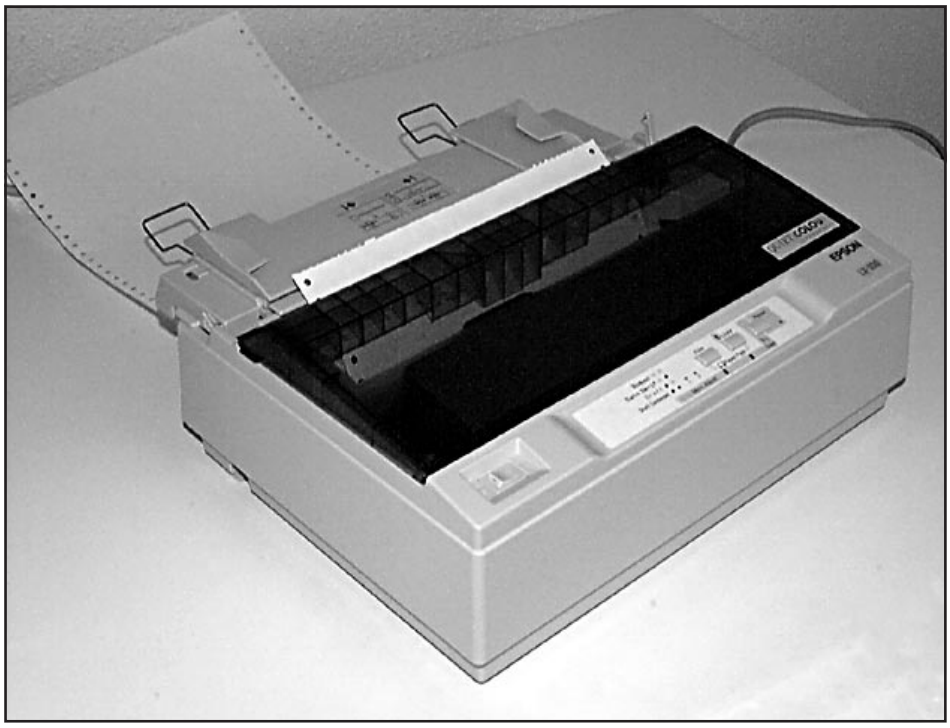
• SPECIFIC KIT OR CONSUMABLES

- None

MICROS 60

- PROCEDURE

NOTE On the MICROS 60, it is necessary to select the printer format RESERVED 1 of the "PRINTER" menu (function 4) accessible through the "OPTIONS" menu (function 5 of the main menu) then "RESULTS" (function 1).



Diag.1

1 - Printer configuration :

The printer configuration is printed out when pressing the key <FONT> when the printer is switched ON. The configuration used for the MICROS 60 is the factory configuration :

```
**************************************************
      << Current settings >>
Character spacing          10 cpi
Shape of zero              0
Skip-over-perforation      Off
Character table            PC 437
Auto line feed             Off
Page length                12  inches
Auto tear off              Off
Tractor                    Single
Interface                  Auto selection (10 sec.)
Bit rate                   9600 bps
Parity                     None
Data length                8 bit
ETX/ACK                    Off
Software                   ESC/P
Auto CR                    Off
```

Diag.2

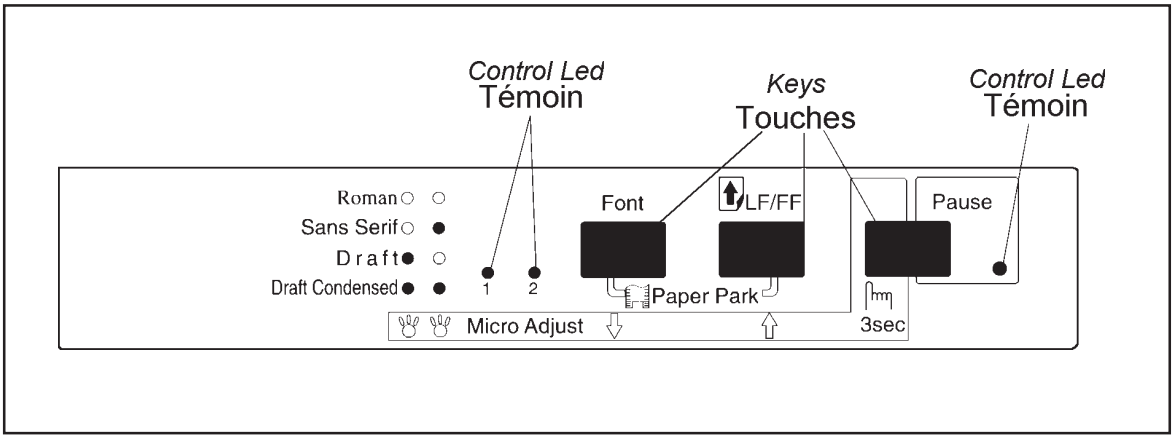
Each parameter can be modified by the corresponding parameter chart. Each chart is accessible using the keys <PAUSE>, <FONT> and <LF/FF> according to the control LED combinaisons :

Table B

Lights 1	Lights 2	Lights PAUSE	Setting	Go to submenu
BLINKS	OFF	OFF	Character spacing	Table C
BLINKS	ON	OFF	Shape of zero	Table D
OFF	BLINKS	OFF	Skip-over-perforation	Table E
ON	BLINKS	OFF	Character table	Table F
BLINKS	BLINKS	OFF	Auto line feed	Table G
BLINKS	OFF	ON	Page length	Table H
BLINKS	ON	ON	Auto tear off	Table I
OFF	BLINKS	ON	Tractor	Table J
ON	BLINKS	ON	Interface	Table K
BLINKS	BLINKS	ON	Bit rate	Table L
OFF	OFF	BLINKS	Parity	Table M
BLINKS	OFF	BLINKS	Data length	Table N
ON	OFF	BLINKS	ETX/ACK	Table O
ON	ON	BLINKS	Software	Table P
BLINKS	ON	BLINKS	Auto CR	Table Q

Diag.3

2 - Control pannel : (See Diag.4)



Diag.4

The control pannel keys allow the user to set up the main functions of the printer : paper advance, paper ejection, and font selection. Control LEDS indicate the printer status.

3 - Control LEDS and keys :

LED PAUSE : The orange LED PAUSE lights when the printer stops printing. During each power ON, this LED blinks for few seconds and 4 audible beeps occur. When the printer runs out of paper, the
LED blinks and 3 audible beeps occur. This LED lights also when the paper is in its tear off position.
When a problem occurs, this LED lights ON and 5 audible beeps occur.

LEDS FONT 1 and ***FONT 2*** : These 2 green LEDS indicate the selected font. Refer to the printer user's manual to select the font.

Key FONT : During normal operation, the FONT key allows the font selection. For each pressure on this key, the selection is modified. Refer to the printer user's manual to select the font. When this key is pressed during the printer power ON, the printer setup menu is entered.

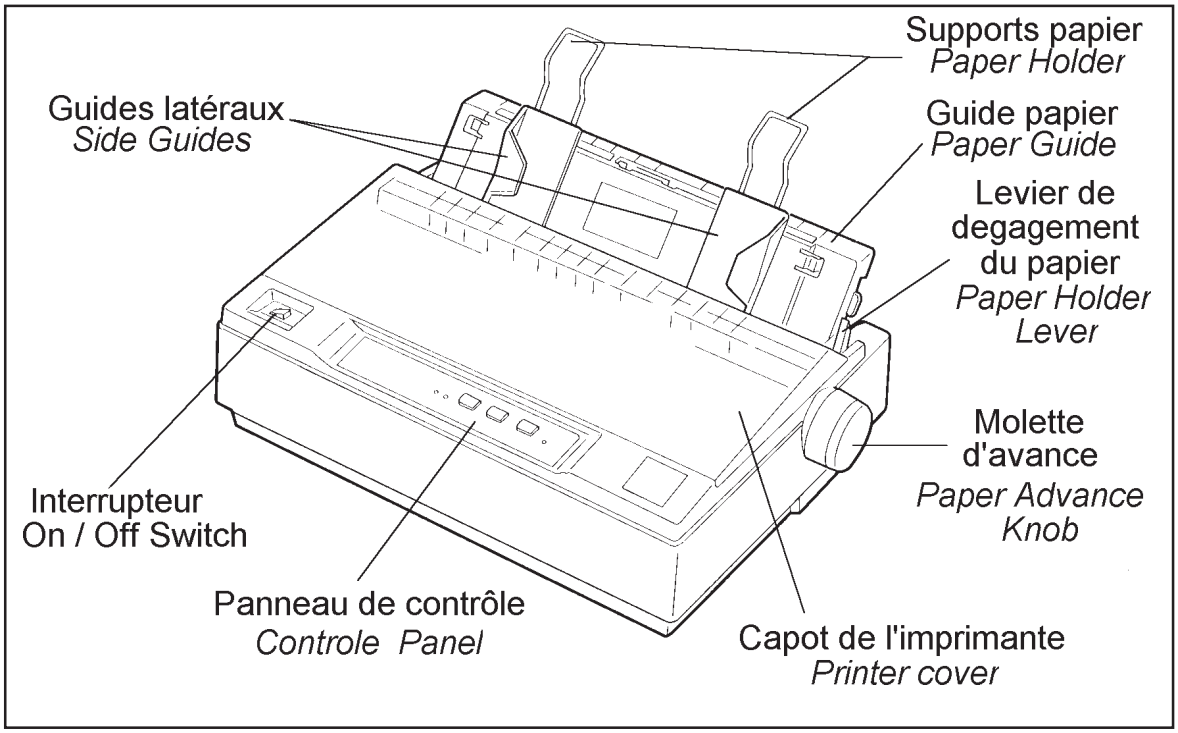
Key LF/FF : During normal operation, a quick pressure on this key allows a ligne feed of the paper. Keep the pressure on this key to feed a whole page. This key can be used to load or eject the paper.
When this key is pressed during the printer power ON, the printing test starts.

Key PAUSE : When this key is pressed during the printing, the printout stops. Press again on this key to restart the printout.

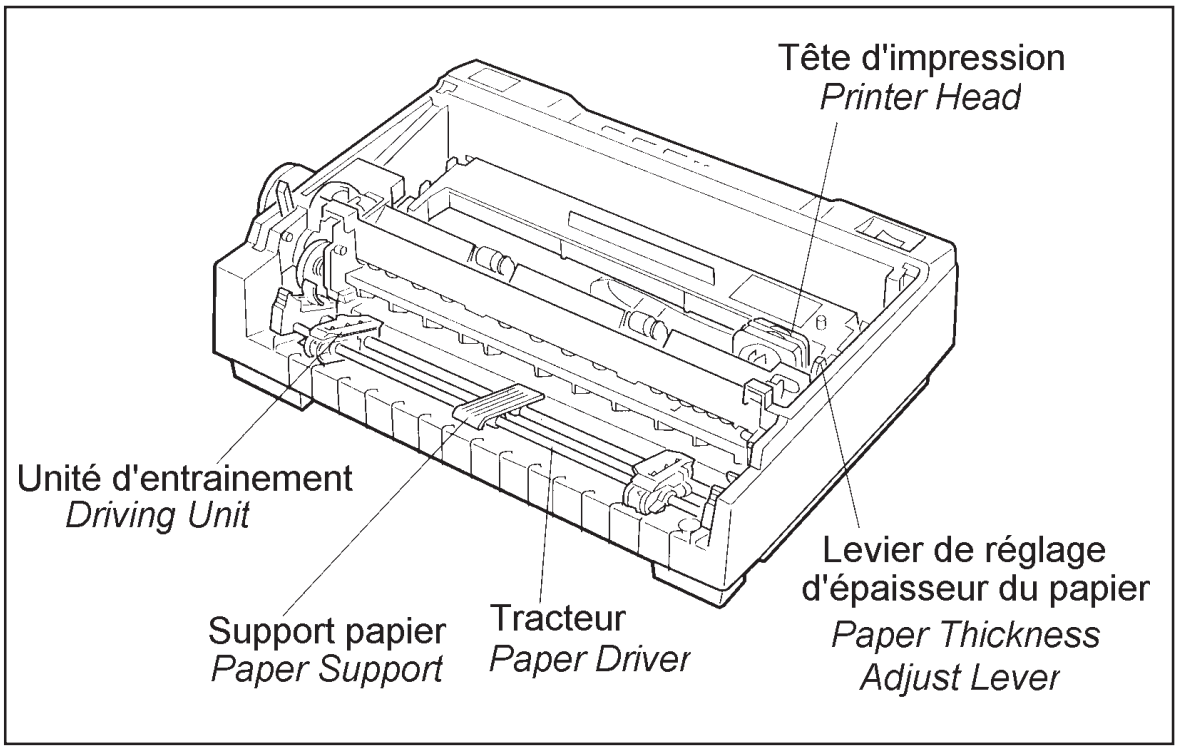
PAPER PARK : If Z folded paper is used, the paper can be driven to its parking position when pressing simultaneously on the keys LF/FF and FONT.

MICRO ADJUST : This function allows to adjust the loading paper position. See the user's manual for details.

4 - Printer description :



Diag.5



Diag.6

LIQUID SYRINGES

MICROS 60

Hématologie

16/06/98

• CONCERNS

Lyse dispenser O ring replacement
Diluent dispenser O ring replacement
Sampling needle dispenser O ring replacement
Lubrication of the liquid syringes

• REQUIRED TOOLS

- Hexagonal keys
- Dynamometric screw driver : A302 : MAG 019 A
  A301 : MAG 020 A

• REQUIRED PRODUCTS

- Silicone grease : LAM 004 A
- Soft paper
- Grease for mechanical assemblies : XEA 381 AS

• INTERVENTION TIME

- 30 min

• FREQUENCY

- Once a year or on request

• SPECIFIC KIT OR CONSUMABLES

- O ring kit : XEA 328 AS

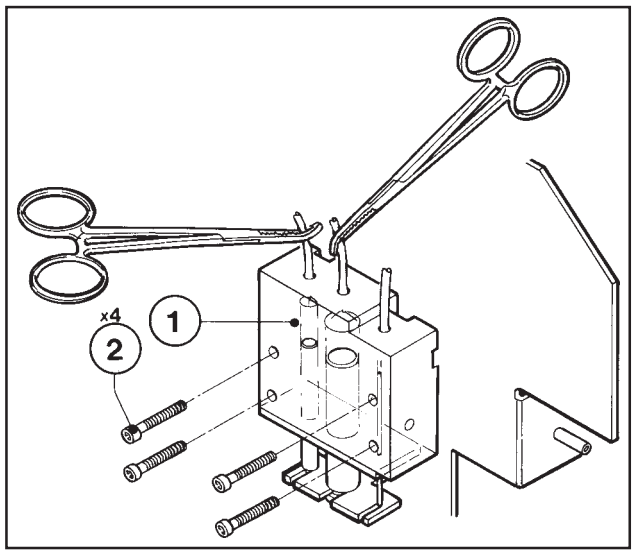
MICROS 60

- PROCEDURE

NOTE In case of a leak on one of the three syringes it is recommended to replace the entire dilution block. If not proceed as following :

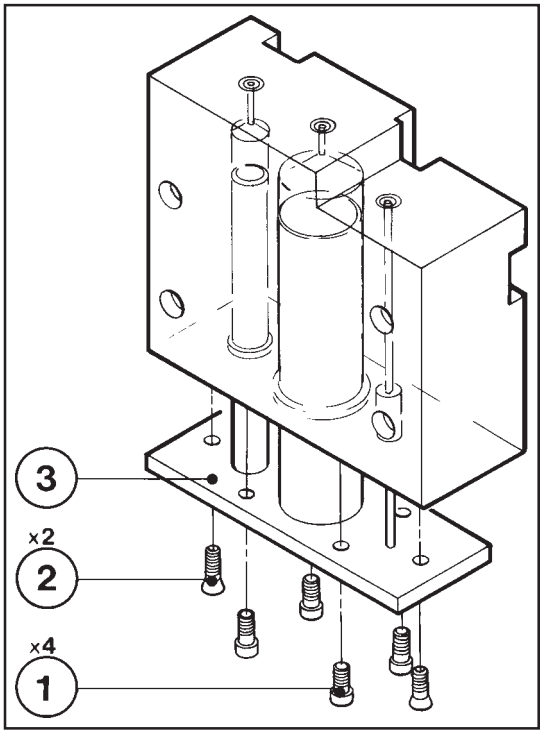
- Pull the piston assy in the upper position and clamp the diluent and lyse tubing as described on the diagram 1.

- Disconnect the diluent/lyse/sampling tubings from the 3 syringes and the tube on the sampling syringe side.



Diag.1

- Unscrew the 4 fixation screws (2), and remove the dilution block (1) (Diagram 1).

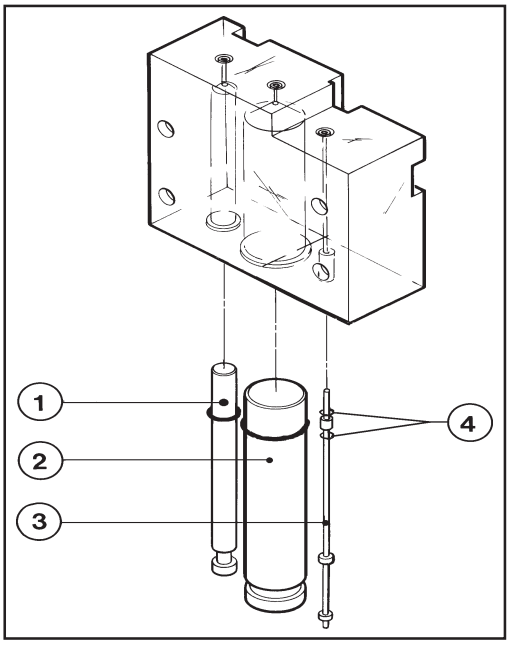


Diag.2

- Unscrew the 6 screws (1) and (2) in order to remove the body cover (3) (Diagram 2).

- Pull out the pistons 1, 2 and 3 from the body with their respective o ring still around (Diagram 3).

- Replace the lyse and diluent O rings by new ones. Check the cleanliness of the piston and of the syringe bodies. If necessary clean with a soft paper.



Diag.3

- Spread a little amount of silicone grease between two fingers and apply a very thin film of grease on the 2 new sampling syringe O rings. Replace the old ones (4) .

- Reinstall the dilution block assy in the reverse order.

Use the A302 dynamometric screw driver to tighten the screws (1) to **700mN.m** (Diagram 2).

Use the A301 dynamometric screw driver to tighten the screws (2) to **400mN.m** (Diagram 2).

• Lubrication

- Disconnect the diluent and waste inputs located at the rear of the instrument (or remove the reagent pack)

- Move the liquid syringe by hand in order to have an access to the motor gearings.

- Spread a little amount of grease on the gearings and on the piston axis (Diag.4).

- Move by hand the syringe assembly to spread the grease on all parts of the gearings and piston axis.

- Re-install the instrument cover, reconnect the waste and diluent tubes, reconnect the power cable.

- Switch the instrument on and run several priming cycles.

CAUTION

Place some absorbant paper at the instrument rear connections (diluent and waste) as some liquids may come out when the syringe is pushed.

MICROS 60

VACUUM/WASTE SYRINGE MAINTENANCE

Hématologie

16/06/98

• CONCERNS

- O ring replacement

• REQUIRED TOOLS

- Hexagonal keys
- Dynamometric screw driver A302 : MAG 019 A

• REQUIRED PRODUCTS

- Silicone grease : LAM 004 A
- Grease for mechanical assemblies : XEA 381 AS.

• INTERVENTION TIME

- 20 min

• FREQUENCY

- See maintenance chart table

• SPECIFIC KIT OR CONSUMABLES

- O ring kit : XEA 328 AS

VACUUM/WASTE SYRINGE MAINTENANCE

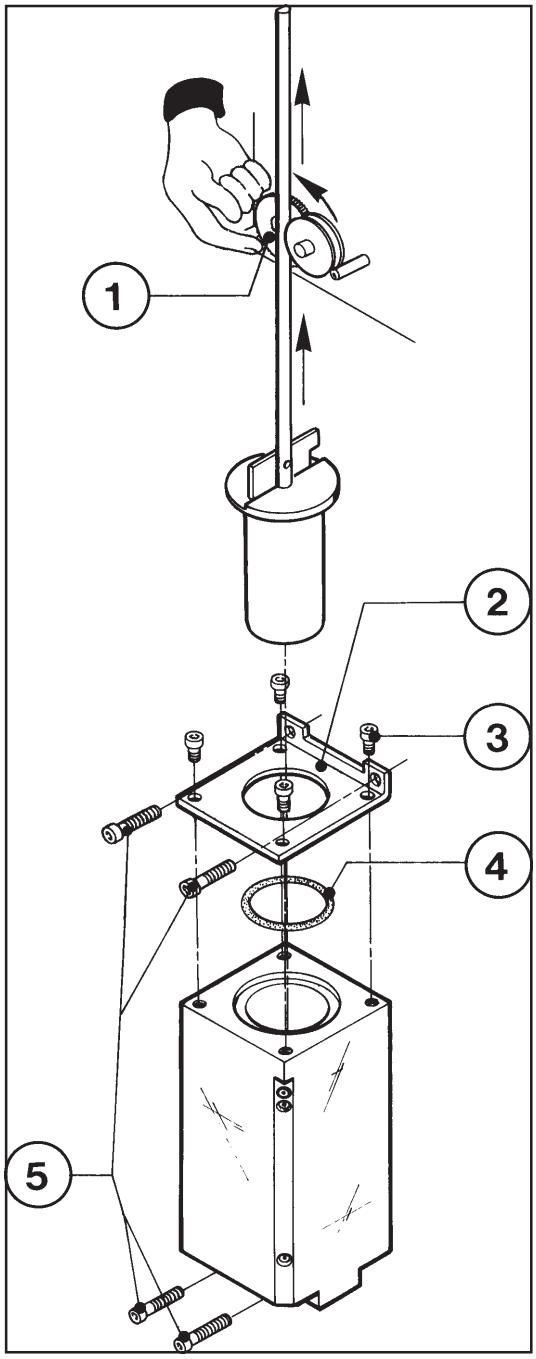
• PROCEDURE

- Manually pull the syringe piston up in order to freed it from the syringe body.

NOTE

The syringe has to be linked to the atmosphere, pressing the valve (2), to pull the piston out from the syringe body.

Turn the cylindrical gearing (1) by hand to help the raising of the piston (See Diagram 1).



Diag.1

- Unscrew the fixation screws (5) in order to remove the syringe body.
- Unscrew the O ring tightening screws (3) and remove the O ring (4).

- Spread a little amount of silicone grease between two fingers and apply a very thin film of grease on a new O ring.
- Reinstall in the reverse order. Apply the following torque to the screws (5) : 700 mN.m.

CAUTION

Push the piston back inside the syringe body before tightening the o ring fixation screws (3). Use the dynamometric screw driver to tighten the screws (3) to 400 mN.m

- Check the watertightness of the syringe running a «CHECK PRESSURE» cycle (see procedure : RAS 172 A for OT or RAS 176 A for CT).

- Run cycles and check for correct operations.

• **Lubrication**

- Switch off the instrument and remove the power cable.

- Disconnect the diluent and waste inputs located at the rear of the instrument.

- Using a small and flat screwdriver, spread a little amount of grease on the gearings of the air syringe reductor plate (Diag.2).

Diag.2

- Spread a little amount of grease on the coggs of the piston axis (Diag.3).

Diag.3

Diag.4

- Move by hand the piston axis up and down in order to spread the grease all around the gearings and along the axis (Diag.4).

INSTRUMENT LANGUAGE

MICROS 60

Hématologie

01/04/98

• CONCERNS

Changing the instrument language

• REQUIRED TOOLS

Pair of pliers

• REQUIRED PRODUCTS

None

• INTERVENTION TIME

5 minutes

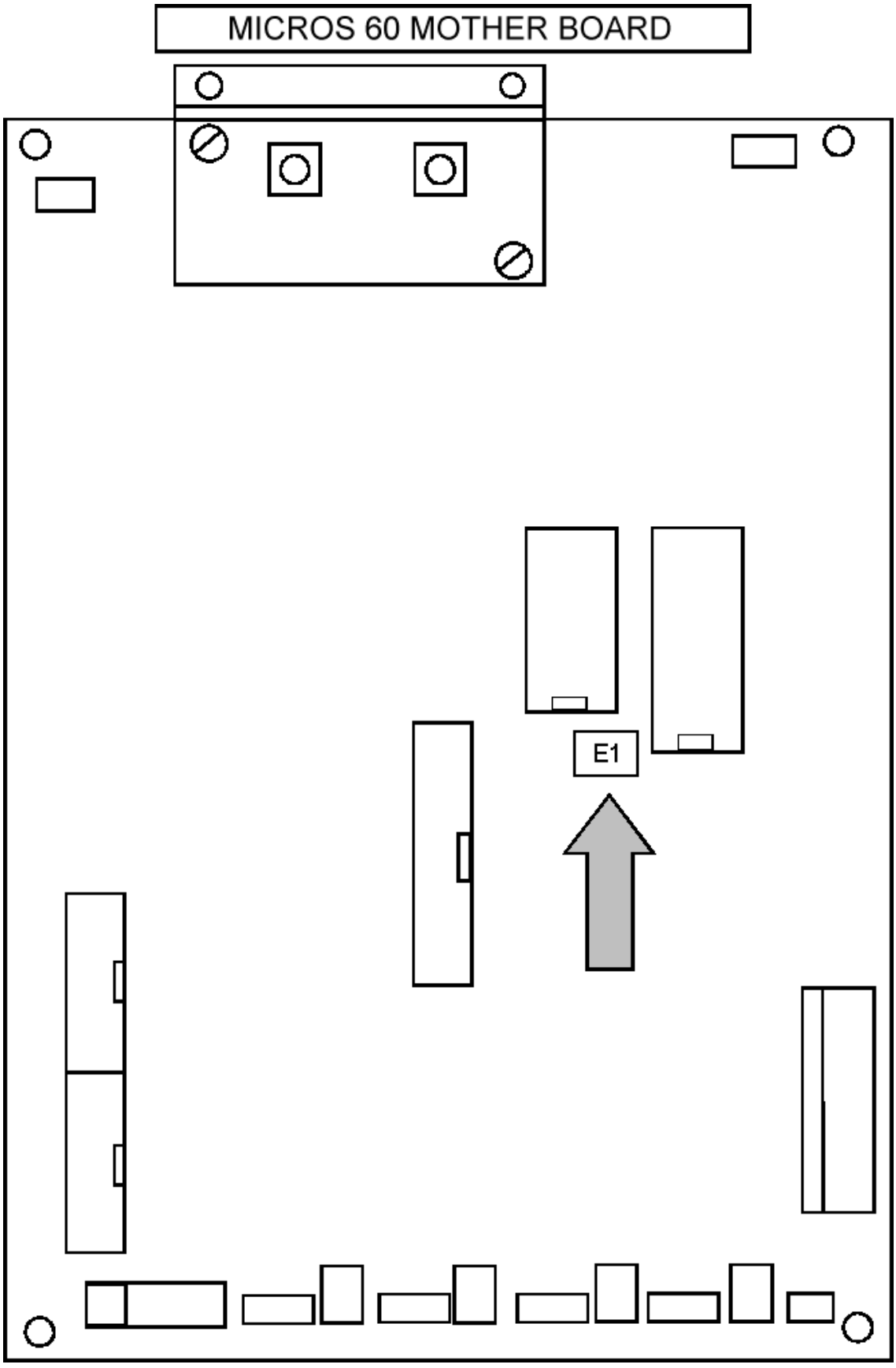
• FREQUENCY

On request only

• SPECIFIC KIT OR CONSUMABLES

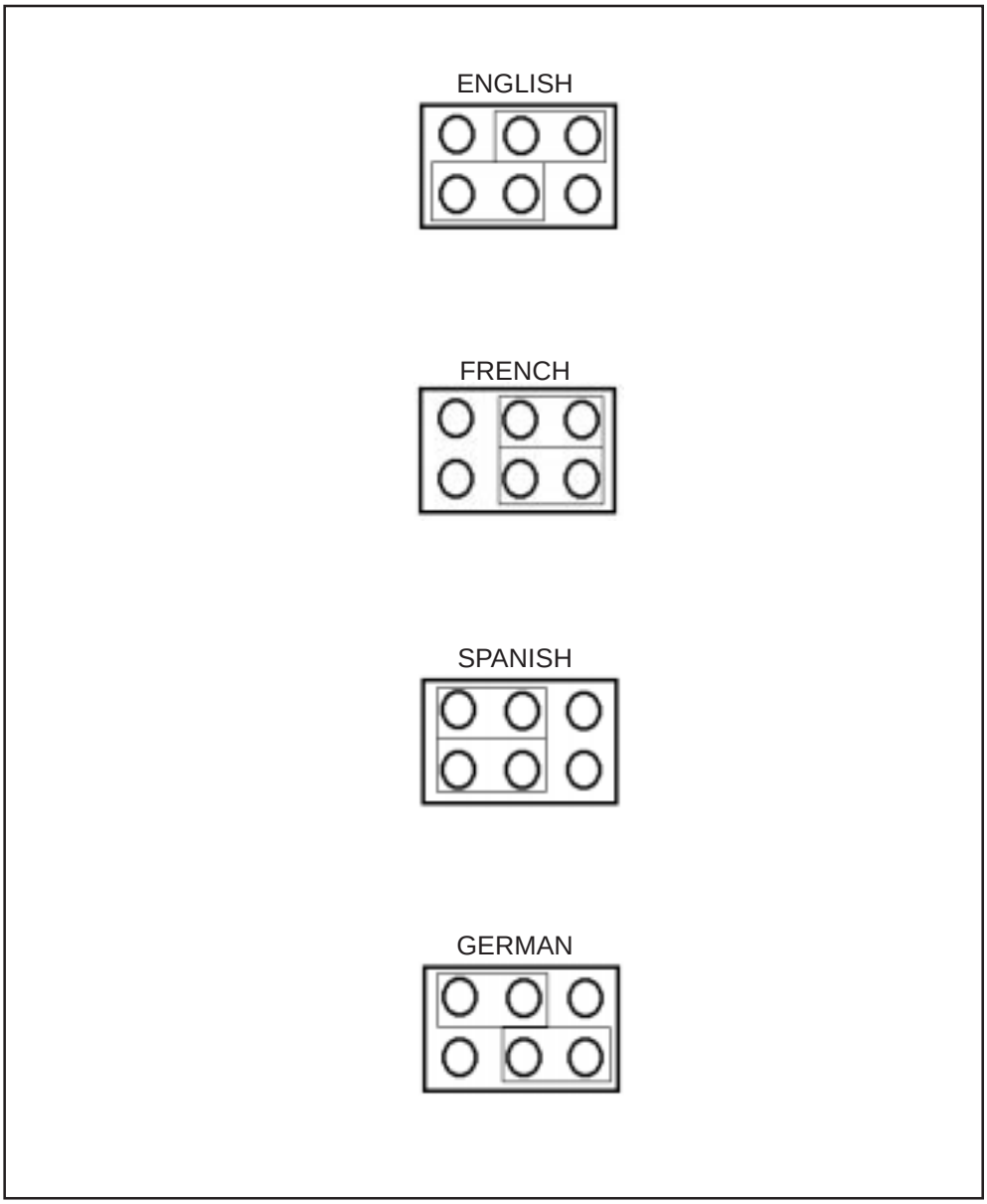
None

- PROCEDURE



- Replug the jumpers on E1 according to the wished language :

JUMPER CONFIGURATION ON E1



- Switch on the instrument.

MICROS 90

REAGENT PACK

MICROS 60

Hématologie

10/04/98

• CONCERNS

- Replacement of the waste connector O ring
- Replacement of the diluent/clean/lyse O rings

• REQUIRED TOOLS

- Pair of pliers
- Torx keys

• REQUIRED PRODUCTS

- None

• INTERVENTION TIME

- 15 min

• FREQUENCY

- O ring replacements : 1/year

• SPECIFIC KIT OR CONSUMABLES

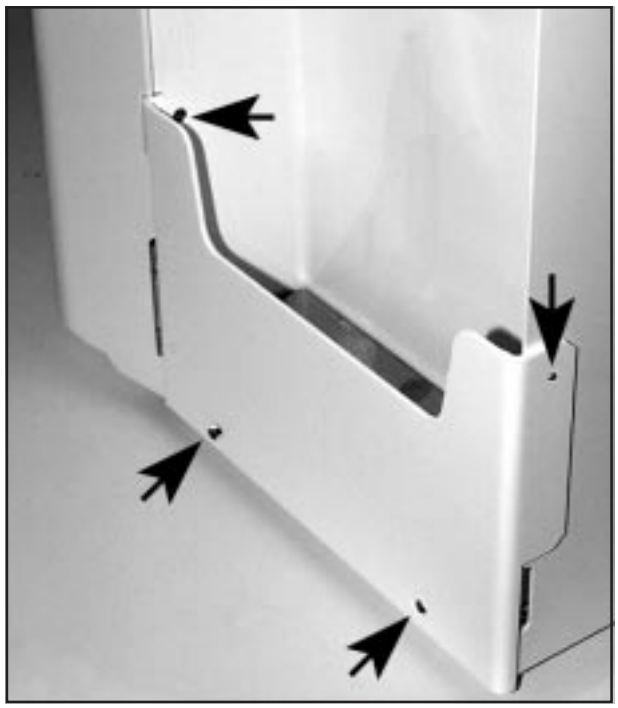
- O rings : FAA 036 A

MICROS 60

• PROCEDURE

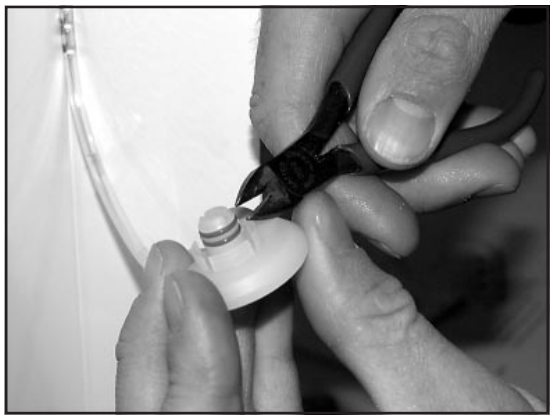
- Disconnect the pack if this one is still connected.

- Dismantle the reagent pack front panel unscrewing the four torx screws as shown on the diagram 1.



Diag.1

Diag.2



Diag.3

- Use a pair of pliers to cut the O rings of the reagent connectors (diag 2) .

- Replace the O rings by new ones.

- Replace as well the waste connector O ring (diag 3).

BARCODE READER

MICROS 60

Hématologie

20/04/98

• CONCERNS

Barcode reader installation & configuration

• REQUIRED TOOLS

None.

• REQUIRED PRODUCTS

None.

• INTERVENTION TIME

10 minutes.

• FREQUENCY

On request.

• SPECIFIC KIT OR CONSUMABLES

Installation kit : XBA 379 AS

• PROCEDURE

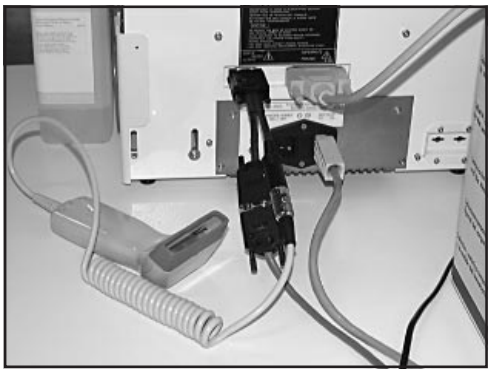
Installation :

- Switch off the instrument.
- Open the instrument cover.
- Install the jumper (included in the XBA 379 AS kit) on **E10** as shown on the diagram 3.

WARNING !

Once the jumper installed on E10, the instrument data ouput receives 5 volts to supply the barcode reader. This voltage should cause damages on computer connection if this one is directly connected on the MICROS 60 data ouput. It is then mandatory to connect the computer connection only on the cable (DAC 023 AS shown on the diagram 2) intended for it.

- Connect the BARCODE reader in the DIN plug of the RS adaptor wiring (diag 1 and 2).



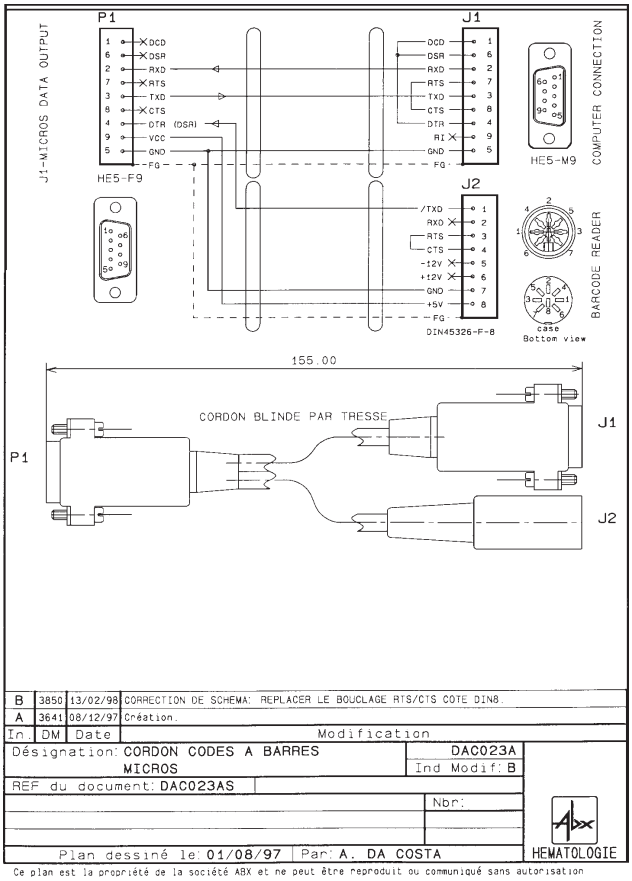
Diag.1

Setup :

- Switch on the instrument and within the 15 first seconds, read from the top to the bottom the 3 barcode labels located on the top left of the page 4 of this procedure. The audible beep occurs after each reading.

- After the 3 labels (the audible signal beeps 5 times) read all the labels from top to bottom and from left to right.

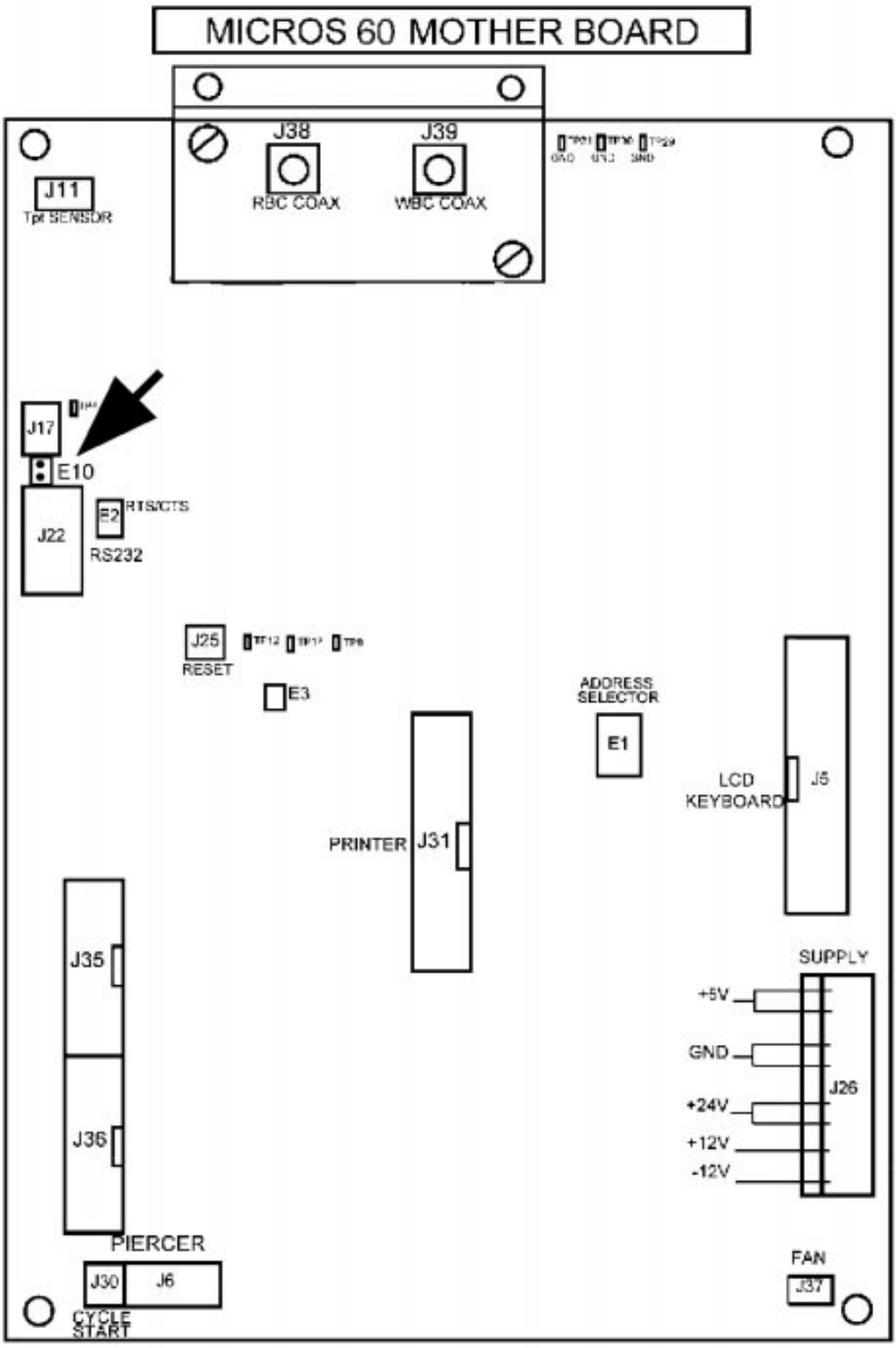
- When the last label is read, the signal beeps 5 times in order to indicate the end of the setup. Check on the test labels located on the last page that the reading is correct.



Diag.2

NOTE

- In case of difficulties to read 2 consecutive 0, move away the barcode reader from the page after the first reading and then read the second 0.
- To carry out the *read test after setup* the instrument must be configurated in a US mode in order to obtain the barcode identification in the ID field (menu 5 - SETUP / 3 - SPECIAL / 7- ID MODE).
- The barcode reader can be configurated according to the type of barcode label in use (from the menu 5 - SETUP / 6 - BARCODE) and allows to enable the checksum or not.
The barcode setup can be printed out by the function 5 - SETUP / 3 - SPECIAL / 5 - PRINT CONFIG.



Diag.3

MICROS 60

MICROSOFT

Within 15 seconds after switch on :

(5 beeps)

Setup : default setting

Parity : even

1 bit stop

Code identifier : no

Codabar : yes

No start/stop code

No STF

No C93

C128

Ø

Ø

Enter

Exit

5 Beeps

READ TEST AFTER SETUP

WITH CHECKSUM

EAN 8

1234567

EAN 8

1234567

EAN 13

123456789012

EAN 13

123456789012

WITHOUT CHECKSUM

C39

TEST

2/5

9076543210

CODABAR

543210

C 128

98765

MICROS 60

MICROS 60 OT

HYDRAULIC CYCLE CHECKUP

Hématologie

16/04/98

• CONCERNS

Step by step control of the hydraulic cycle.

• REQUIRED TOOLS

None

• REQUIRED PRODUCTS

Blood samples

• INTERVENTION TIME

15 minutes

• FREQUENCY

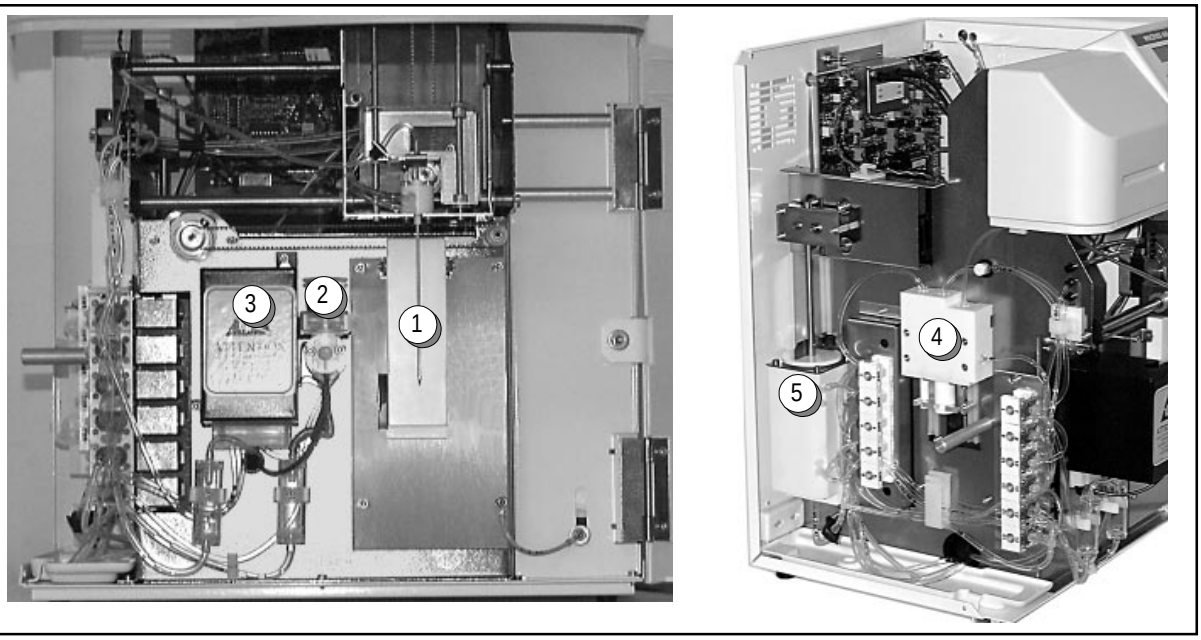
On request

• SPECIFIC KIT OR CONSUMABLES

None

HYDRAULIC CYCLE CHECKUP

• PROCEDURE



Diag.1

1 - Cycle start condition

• Needle (1) in the sampling position (diag 1).

• RBC chamber (2) filled with 2.5ml of diluent.

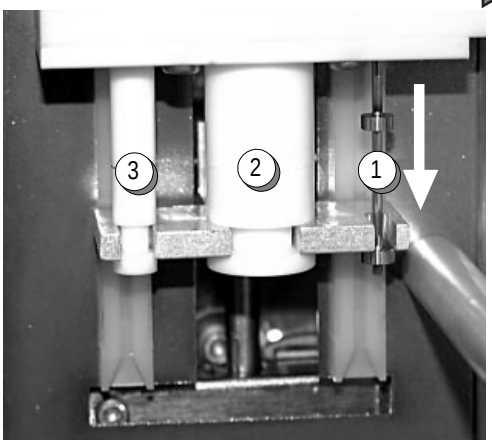
• WBC/HGB chamber (3) filled with 2.5ml of diluent.

• Liquid syringes (4) in standby position.

• Vacuum/waste syringe (5) in the lower position.

2 - Sampling

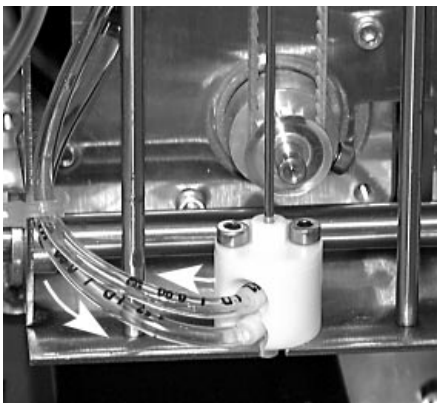
• Aspiration of 10µl of blood sample



Diag.2

Causes
The liquid syringes assembly moves down (diag 2) and pulls down the micro sampling syringe (1) .

3 - Outer sampling needle rinse



Diag.3

Causes

- The sampling needle moves up.

- The liquid syringes (2) (diag 2) send diluent for rinse through the rinsing block

- Polluted diluent is aspirated (from the lower to the upper tube) by means of waste/Vacuum syringe raise.

Diag.4

4 - WBC/HGB chamber rinse & HGB blank measure

- Sampling carriage transfer over the WBC/HGB chamber.
- Counting head rinse →

Causes

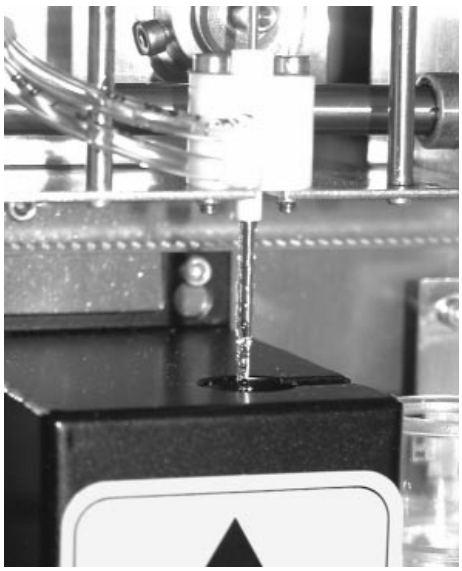
Diluent is delivered by means of the liquid syringes raise

- WBC/HGB chamber drain →

Aspiration by means of the Vacuum/waste syringe raise (diag 4)

- Needle motion downward of a few steps (Diag 5)
- Diluent is delivered from the rinsing block →

The liquid syringes move up and a flow of diluent is delivered to the chamber via the outer needle.



Diag.5

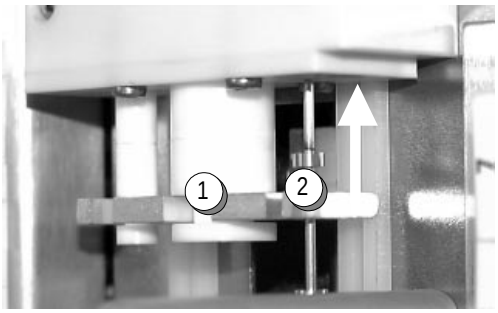
• WBC/HGB chamber drain (second time)
• Diluent is delivered from the outer needle (second time)
• HGB blank measure (beep triggered)
• RBC and WBC/HGB chamber drains.

5 - Dilutions
• Sampling needle moves down to the WBC/HGB chamber
• Injection of 1.7ml of diluent into the WBC/HGB chamber
+ Injection of 10µl of blood sample

Causes
Raise of the liquide syringes (diag 6) :
- delivers 0.5ml of diluent from the outer sampling needle
- injects 1.2ml of diluent + blood sample from the inner sampling needle

• Bubbling

Bubbling by means of vacuum/ waste syringe downward motion (Diag 7).

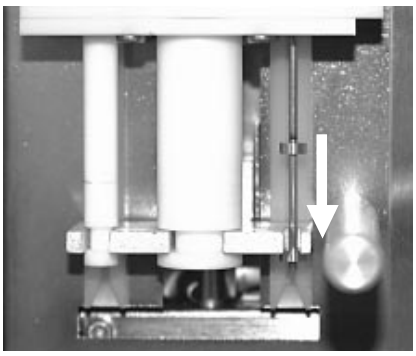


Diag.6

Diag.7

• Sampling needle moves up
• Outer needle short aspiration (dries the needle)
• Sampling needle moves back in the chamber
• Aspiration of 28.3µl of diluted blood (dilution 1/170)

Causes
The liquid syringes move down and pull down the micro sampling syringe (diag. 8)



Diag.8

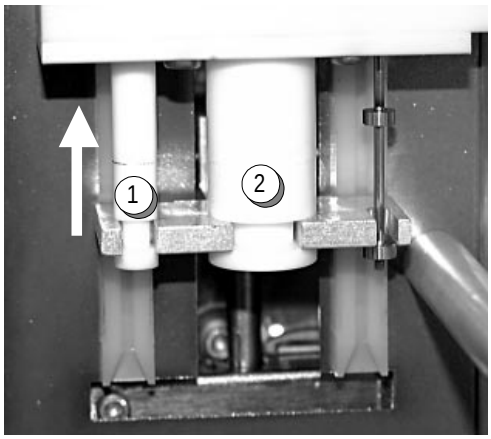
• Sampling needle moves up
• Injection of 0.4 ml of diluent into the WBC/HGB chamber

Causes
Raise of the liquide syringes (diag.6) :
- delivers 0.4ml of diluent from the outer sampling needle

- Outer needle aspiration
- Carriage motion over the RBC chamber
- Sampling needle moves down into the RBC chamber
- Lyse injection into the WBC/HGB chamber

Causes
The liquid syringes raise (diag 8) and the syringe (1) delivers 0.52ml of lyse via the WBC chamber bottom

FINAL DILUTION in the WBC CHAMBER :
1.7ml + 0.4ml diluent + 0.52ml of lyse = 1/260



Diag.8

Diag.9

- Injection of 2.5 ml of diluent into the RBC chamber
+ Injection of 28.3 µl of diluted blood

Causes
The liquid syringes raise (diag 8) :
- delivers 0.5ml diluent via the outer sampling needle
- injects diluted blood from the inner needle + 2ml of diluent

FINAL DILUTION in the RBC CHAMBER :
28.3µl of diluted blood at 1/170 + 2.5ml diluent

$$\frac{1}{170} * \frac{28.33}{2500} = \frac{1}{15000}$$

- Bubbling (diag 10)
- Sampling needle moves up
- Carriage motion over the WBC/HGB chamber
- Counting head rinse

Diag.10

6 - Counts
- First counts (beep triggered)
- Counting head rinse
- Second counts (beep triggered)

NOTE

A third count (C3) is carried out if the difference between first (C1) and second count (C2) is not within acceptable limits :

- WBC :
  if C1 or C2 > 3000
  C3 is carried out if difference between C1 and C2 > 7%

  if Max C1 or C2 ≤ 3000
  C3 is carried out if difference between C1 and C2 > 9%

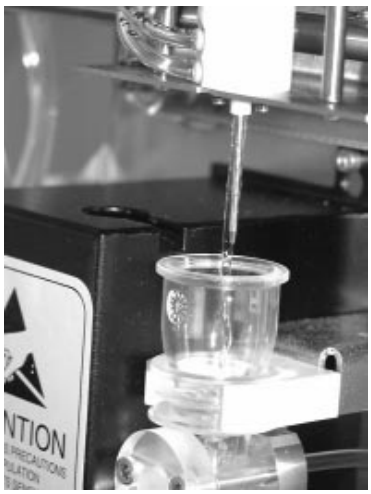
- RBC :
  if C1 or C2 > 16000
  C3 is carried out if difference between C1 and C2 > 5%

  if Max C1 or C2 ≤ 16000
  C3 is carried out if difference between C1 and C2 > 8%

- PLT :
  if C1 or C2 > 400
  C3 is carried out if difference between C1 and C2 > 15%

  if Max C1 or C2 ≤ 400
  C3 is carried out if difference between C1 and C2 > 20%

- Counting head rinse
- WBC chamber drain
- Diluent injection into the WBC chamber from the outer needle
- RBC chamber drain
- Carriage motion over the RBC chamber
- Diluent injection into the RBC chamber from the outer needle (diag 11)



Diag.11

- Carriage & needle motions back to the initial positions
- Results display and printed out

MICROS 60 CT

HYDRAULIC CYCLE CHECKUP

Hématologie

02/06/98

• CONCERNS

Step by step control of the hydraulic cycle.

• REQUIRED TOOLS

None

• REQUIRED PRODUCTS

Blood samples

• INTERVENTION TIME

15 minutes

• FREQUENCY

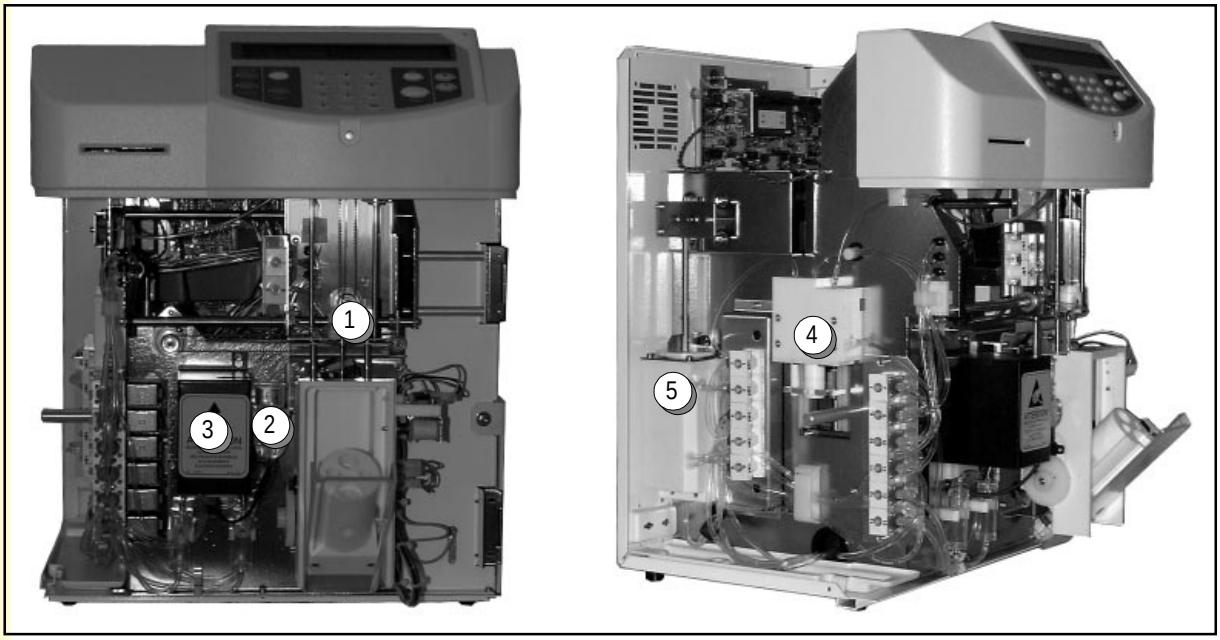
On request

• SPECIFIC KIT OR CONSUMABLES

None

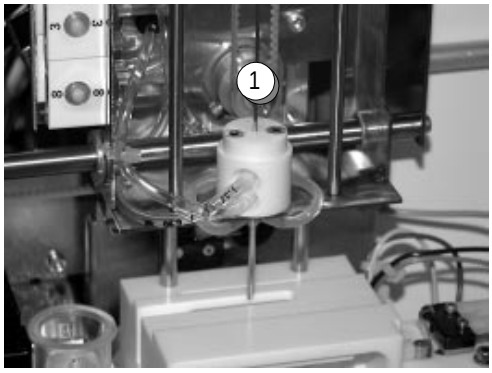
Hydraulic cycle checkup

• PROCEDURE



Diag.1

1 - Cycle start condition



Diag.2

• Needle (1) in the sampling position (diag 1 & 2).

• RBC chamber (2) filled with 2.5ml of diluent.

• WBC/HGB chamber (3) filled with 2.5ml of diluent.

• Liquid syringes (4) in standby position.

• Vacuum/waste syringe (5) in the lower position.

2 - Cap piercing

• Carriage motion over the WBC chamber.
• WBC/HGB chamber drain →

Causes
Aspiration by means of the Vacuum/waste syringe raise.

• Diluent injection into the WBC/HGB chamber through the channels (A) and (B) (see diag.4) →

Diluent is delivered by means of the liquid syringes raise

• HGB blank measure (beep triggered)
• Carriage return over the piercing device
• Atmosphere is provided inside the tube →

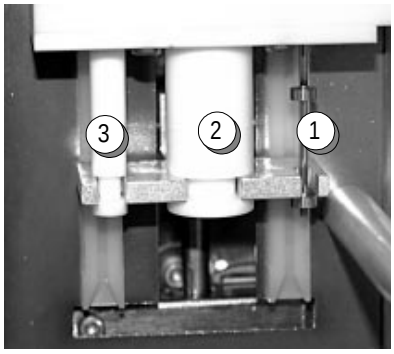
Causes
Liquid valve #3 is activated

• Cap piercing →

Sampling holder rises in the upper position.
The needle pierces the tube cap

3 - Sampling

- Sampling needle (diag. 2) moves down to the lower position (inside the tube)
- Aspiration of 10µl of blood sample



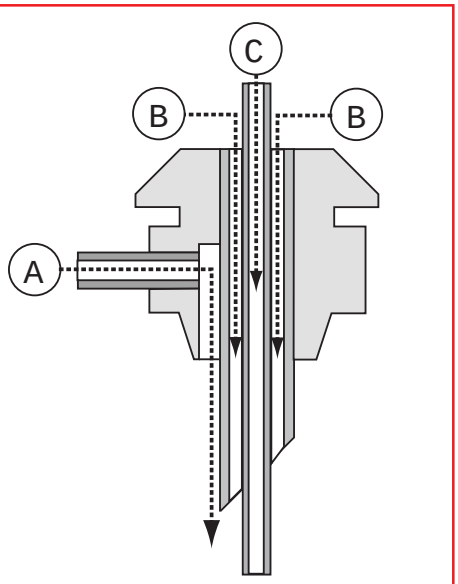
Diag.3

Causes

The liquid syringes assembly moves down (diag 3) and pulls down the micro sampling syringe (1) .

- The sampling needle comes back in the upper position
- RBC chamber drain
- Counting head rinse
- Carriage motion over the WBC/HGB chamber
- Sampling holder door opens
- WBC/HGB chamber drain

4 - needle rinses

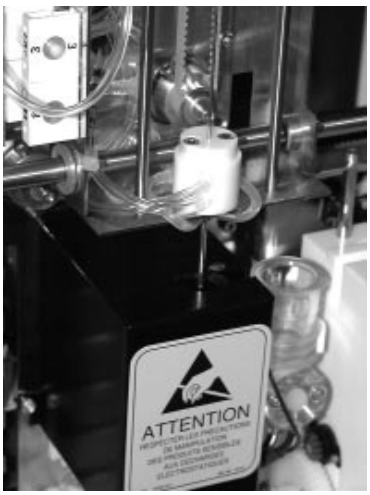


A - Piercing needle outer channel
B - Sampling needle outer channel
C - Sampling needle inner channel

Diag.4

Causes

- The liquid syringe (2) (diag 3) sends diluent for rinse through the outer piercing needle (A) (diag 4) and inner piercing needle (B). The polluted diluent is sent to the WBC/HGB chamber.



Diag.5

NOTE The piercing needle inner rinse is equivalent to the sampling needle outer rinse.

- WBC/HGB chamber drain
- Second needle rinses
- WBC/HGB chamber drain
- The sampling needle moves down into the WBC/HGB chamber

5 - Dilutions

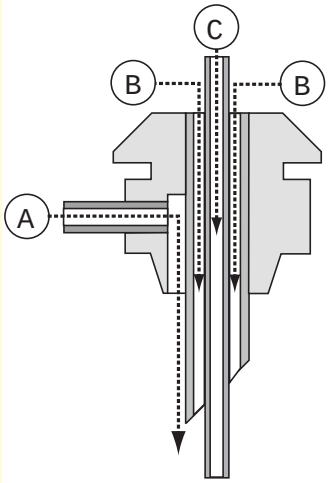
• Injection of 1.7ml of diluent into the WBC/HGB chamber
+ Injection of 10µl of blood sample

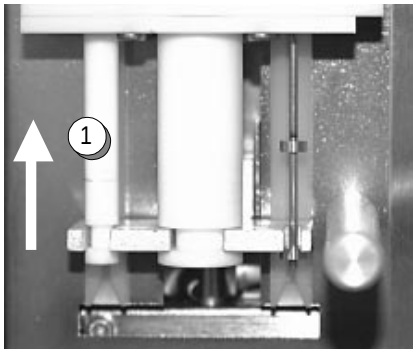
Causes
Raise of the liquide syringes (diag 7) :
- delivers 0.5ml of diluent from the outer sampling needle (channel B diag.6)
- injects 1.2ml of diluent + blood sample from the inner sampling needle (channel C)

• Bubbling

Bubbling by means of vacuum/ waste syringe downward motion (Diag 8).

• Sampling needle moves up
• Outer needle short aspiration (dries the needle)





Diag.6 ***Diag.7*** ***Diag.8***

• Sampling needle moves back in the chamber
• Aspiration of 28.3µl of diluted blood (dilution at 1/170)

• Sampling needle moves up
• Injection of 0.4 ml of diluent into the WBC/HGB chamber

Causes
Raise of the liquide syringes (diag.7) :
- delivers 0.4ml of diluent from the outer sampling needle (channel B)

• Carriage motion over the RBC chamber
• Sampling needle moves down to the RBC chamber

• Lyse injection into the WBC chamber + Bubbling

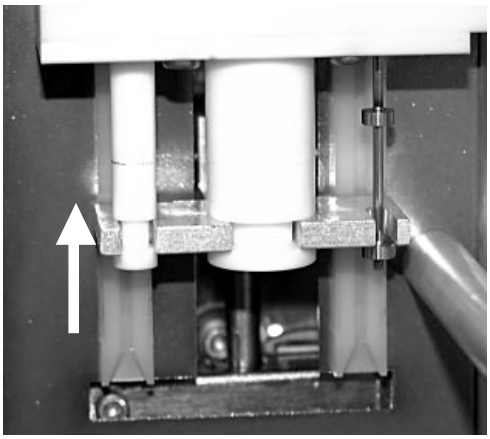
Causes
The liquid syringes raise (diag.7) and the syringe (1) delivers 0.52ml of lyse via the WBC chamber bottom

FINAL DILUTION in the WBC CHAMBER :
1.7ml + 0.4ml diluent + 0.52ml of lyse = 1/260

Hydraulic cycle checkup

• Injection of 2.5 ml of diluent into the RBC chamber
+ Injection 28.3 µl of diluted blood

Causes
The liquid syringes raise (diag.9) :
- delivers 0.5ml diluent via the outer sampling needle (channel B diag. 6)
- injects diluted blood from the inner needle + 2ml of diluent (channel C)



Diag.9

Diag.10

FINAL DILUTION in the RBC CHAMBER :
28.3µl of diluted blood at 1/170 + 2.5ml diluent

$$\frac{1}{170} * \frac{28.33}{2500} = \frac{1}{15000}$$

• Bubbling (diag 11)
• Sampling needle moves up
• Carriage motion over the WBC/HGB chamber
• Counting head rinse

Diag.11

6 - Counts

- First counts (beep triggered)
- Counting head rinse
- Second counts (beep triggered)

NOTE

A third count (C3) is carried out if the difference between first (C1) and second count (C2) is not within acceptable limits :

- WBC :
  - if C1 or C2 > 3000
    C3 is carried out if difference between C1 and C2 > 7%
  - if Max C1 or C2 ≤ 3000
    C3 is carried out if difference between C1 and C2 > 9%
- RBC :
  - if C1 or C2 > 16000
    C3 is carried out if difference between C1 and C2 > 5%
  - if Max C1 or C2 ≤ 16000
    C3 is carried out if difference between C1 and C2 > 8%
- PLT :
  - if C1 or C2 > 400
    C3 is carried out if difference between C1 and C2 > 15%
  - if Max C1 or C2 ≤ 400
    C3 is carried out if difference between C1 and C2 > 20%

- Counting head rinse
- WBC chamber drain
- Diluent injection into the WBC chamber from the outer sampling needle (channel B)
- RBC chamber drain
- Carriage motion over the RBC chamber
- Diluent injection into the RBC chamber from the outer sampling needle (channel B)
- Carriage & needle motions back to the initial positions
- Results display and printed out

OVERALL MAINTENANCE

MICROS 60

Hématologie

05/10/98

• CONCERNS

Instrument maintenance step by step

• REQUIRED TOOLS

Hexagonal keys
Dynamometric screw driver A302, A301, A300
Clamps
Scalpel
Cutting pliers
Pair of scisors
Voltmeter
Flat screw driver
Barflex
Thermometer
Torx keys

• REQUIRED PRODUCTS

Empty sample tubes
Silicone grease
Soft tissue
Liquid soap
Distilled water
Micropipette tip
Flat piece of stiff plastic
Latex WBC, RBC
Felt pen
syringe 5ml
Fresh blood samples
Calibrator
Commercial control

• INTERVENTION TIME

2 h 30

• FREQUENCY

The yearly maintenance frequencies vary with the instrument output.
According to the cycle numbers, 3 categories are created :

< 6000 cycles/year -> 1 overall maintenances/year
6000 to 15000 cycles/year -> 2 overall maintenances/year
> 15000 cycles/year -> 3 overall maintenances/year

• SPECIFIC KIT OR CONSUMABLES

Spare parts kit : XEA 458 AS
Needle position tool : GBC 218 A

Procedures

A - INSTRUMENT CHECKUP

1 - Reagent check

- ✓ Type of reagent used
- ✓ Expiration dates
- ✓ Levels
- ✓ Pack : Number of cycles left

2 - Operation check

- ✓ Blank cycle control
- ✓ QC control
- ✓ Fresh blood sample run
- ✓ Calibration coefficient checkup
- ✓ Leak control and general cleanliness of the instrument

B - CLEANING AND MAINTENANCE

1 - Chamber maintenance

- ✓ RBC & WBC/HGB chamber cleaning
- ✓ Aperture check
- ✓ Coaxial O ring replacement
- ✓ Aperture O ring replacement

  Aperture tightening torque : **100mN.m**

RAS 169 A

2 - Liquid syringes

- ✓ Cleaning
- ✓ O ring replacement (Lyse, diluent, Micro syringe)

RAS 178 A

Torque values :

1. torx screws : **400mN.m**
2. Hexagonal screws : **700mN.m**

Diag.1

- ✓ Lubrication of the gearings and piston axis

3 - Sampling needle

- ✓ Cleaning
- ✓ Sampling needle O ring replacement

  CT : O ring holder tightening torque : **700mN.m**

  OT : O ring holder tightening torque : **100mN.m**

RAS 167 A (CT)
RAS 168 A (OT)

- ✓ Free pulley cleaning and lubrication

  Pulley tightening torque : **400 mN.m**

- ✓ Piercing needle check/cleaning (CT)

4 - Air syringe

- ✓ Cleaning
- ✓ O ring replacement

  O ring tightening torque : **400mN.m**

  Syringe holding torque : **700mN.m**

RAS 179 A

- ✓ Lubrication of the gearings and piston axis

5 - Piercing block maintenance

RAS 198 A (CT)

✓ Check and clean

6 - Reagent pack (Option)

RAS 181 A

✓ Replacement of the connector O rings

C - MECHANICAL OPERATION CHECK

1 - Liquid syringes

✓ Operation check

Menu 4 - SERVICE / 5 - MECHANIC / 4 - LIQ. SYRINGES

2 - Air syringe

✓ Operation check

Menu 4 - SERVICE / 5 - MECHANIC / 5 - PRESSURE SYR.

RAS 173 A

3 - Liquid valves

✓ Operation check

Menu 4 - SERVICE / 5 - MECHANIC / 6 - VALVES

4 - Sampling needle and carriage

✓ Operation check

Menu 4 - SERVICE / 5 - MECHANIC / 2 - NEEDLE U/D

Menu 4 - SERVICE / 5 - MECHANIC / 3 - CARRIAGE L/R

D - MECHANICAL ADJUSTMENTS

1 - Needle heigth

✓ Menu 7 - TECHNICIAN / 2 - ADJUSTMENTS / 7 - POSITION ADJST. / 1 - NEEDLE / 2 - ADJUSTMENT

RAS 172 A (OT)
RAS 176 A (CT)

✓ Needle on the edge of the RBC chamber, press a key.

2 - Needle motion

✓ Tool GBC 218 A over the RBC and WBC chamber.

✓ Menu 7 - TECHNICIAN / 2 - ADJUSTMENTS / 7 - POSITION ADJST. / 2 - CARRIAGE / 2 - ADJUSTMENT

RAS 172 A (OT)
RAS 176 A (CT)

✓ Lower the needle in the WBC chamber , press a key.

E - HYDRAULIC ADJUSTMENTS

✓ PRIME / ALL REAGENTS

✓ Check for leaks

1 - Check vacuum

✓ Barflex connected instead of the tube coming from the valve 8.

✓ Menu SERVICE / 7 - TECHNICIAN / 2 - ADJUSTMENTS / 3 - CHECK PRESSURE

Value : -200mbar $\pm$ 10mbar

RAS 172 A (OT)
RAS 176 A (CT)

✓ Check vacuum drop down during 30 secondes $\leq$ 2 mbar

2 - Bubbling

✓ Menu 7 - TECHNICIAN / 2 - ADJUSTMENTS / 8 - BUBBLING ADJUST. / BUBBLING 1 < > (default value : 175)

RAS 172 A (OT)
RAS 176 A (CT)

✓ Menu 7 - TECHNICIAN / 2 - ADJUSTMENTS / 8 - BUBBLING ADJUST. / BUBBLING 2 < > (default value : 120)

3 - Drain detection

✓ Voltmeter between TP30 and TP6

✓ Drained sensor : adjust the voltage to **4,5V $\pm$ 0,3V** by means of **R6**

✓ Fill the sensor with diluent : voltage falls down below **1Volt**

RAS 174 A

Procedures

4 - Temperature

RAS 172 A (OT)
RAS 176 A (CT)

- ✓ Thermometer plunged into the diluent container (WBC chamber if pack)
- ✓ Menu 7 - TECHNICIAN / 3 - TEMPERATURE / 2 - CALIBRATE
- ✓ Temperature diluent = temperature displayed ± 2°

IMPORTANT

Temperature adjustment must be done 20 minutes at least after the instrument has been switched on.

5 - Photometer calibration

- ✓ Menu 7 - TECHNICIAN / 2 - ADJUSTMENTS / 1 - CAL PHOTOMETER

RAS 172 A (OT)
RAS 176 A (CT)

- ✓ Hgb channel displayed on the screen, adjusted by means of **R97**, according to the room temperature :

ROOM TPT (°C)	CHANNEL			ROOM TPT (°C)	CHANNEL		
	Mini.	Nominal	Maxi.		Mini.	Nominal	Maxi.
18	238	243	248	24	233	238	243
19	237	242	247	25	232	237	242
20	236	241	246	26	231	236	241
21	235	240	245	27	230	235	240
22	234	239	244	28	229	234	239
23	234	239	244	29	228	233	238

6 - Gains

• WBC

- ✓ Latex thoroughly mixed
- ✓ Blank cycle to check the cleanliness
- ✓ Menu 7 - TECHNICIAN / 2 - ADJUST. / 4 - WBC ADJUST / 1 - WBC ADJUST

RAS 172 A (OT)
RAS 176 A (CT)

- ✓ Run an analysis on Latex. Adjust with **R74** to obtain
  - LYM = 57 ± 1
  - GRA = 180 ± 2

• RBC

- ✓ Latex thoroughly mixed
- ✓ Blank cycle to check the cleanliness
- ✓ Menu 7 - TECHNICIAN / 2 - ADJUST. / 5 - RBC PLT ADJUST / 1 - RBC PLT ADJUST
- ✓ Run an analysis on Latex.
- ✓ Adjust :
  - the RBC gain with **R81** to obtain RBC = 74 ± 1
  - The PLT gain with **R87** to obtain PLT = 59 ± 2

RAS 172 A (OT)
RAS 176 A (CT)

F - VOLTAGE CHECKS

Procedures

1 - Power supply

RAS 171 A

✓ Ground on TP31, TP30 or TP29

TEST POINTS	VOLTAGE
TP 20	-12V ± 0,5V
TP 22	24V + 1.5V - 0V
TP 23	5V + 0,3V - 0V
TP21	12V ± 0,5V

2 - RBC, PLT, WBC threshold

RAS 175 A

✓ Ground on TP31

THRESHOLDS	TEST POINTS	VOLTAGE	POTENTIOMETERS
WBC	TP 10	350 mV ± 7	R68
RBC	TP13	400 mV ± 7	R75
PLT	TP16	180 mV ± 3	R82

3 - Stepper motor voltage

RAS 175 A

✓ Ground on TP31

MOTORS	TEST POINTS	VOLTAGE	POTENTIO.
Air syringe	TP36	2.50 V ± 0.05 V	R195
Liquid syringe	TP35	2.00 V ± 0.05 V	R186
Horizontal carriage	TP37	1.50 V ± 0.05 V	R177
Vertical carriage	TP38	1.00 V ± 0.05 V	R168

4 - Aperture voltage

RAS 172 A OT
RAS 176 A CT

✓ Ground on TP30

✓ Menu 4 - SERVICE / 7 - TECHNICIAN / 2 - ADJUSTMENTS / 2 - APERTURE VOLTAGE

✓ Test point on TP 19 : check to have **60V +2.8V -1.5V**

G - BLOOD SAMPLE RUN

1 - Preliminary

✓ Run a STARTUP cycle

2 - Repeatability

✓ Fresh and normal blood sample
✓ Run 20 consecutives analyses

CAUTION

For MICROS 60 CT, it is mandatory to remove the cap from the sample tube to prevent from piercing several times the same cap.

✓ Control to have variation coefficients within the following acceptable limits :

PARAMETERS	% CV	TEST LEVEL
- WBC :	< 2,5%	at 10.10^9 /l
- RBC :	< 2%	at 5.10^{12} /l
- HGB :	< 1,5%	at 15 g/dl
- HCT :	< 2%	at 45 %
- MCV :	< 1%	at 90 fl
- PLT :	< 5%	at 300.10^9 /l
- LYM :	< 5%	at 40%(16/18 param.)
- MON :	< 10%	at 10% (16/18 param.)
- GRA :	< 5%	at 50% (16/18 param.)

CV calculated by means of the below formula :

$$\overline{X} = \frac{\sum Xi}{n} \qquad SD = \sqrt{\frac{\sum (\overline{X} - Xi)^2}{n-1}}$$

$\overline{X}$: Mean
Xi : measure value
n : Measure number
SD : Standard deviation

$$CV(\%) = \frac{SD}{\overline{X}} \times 100$$

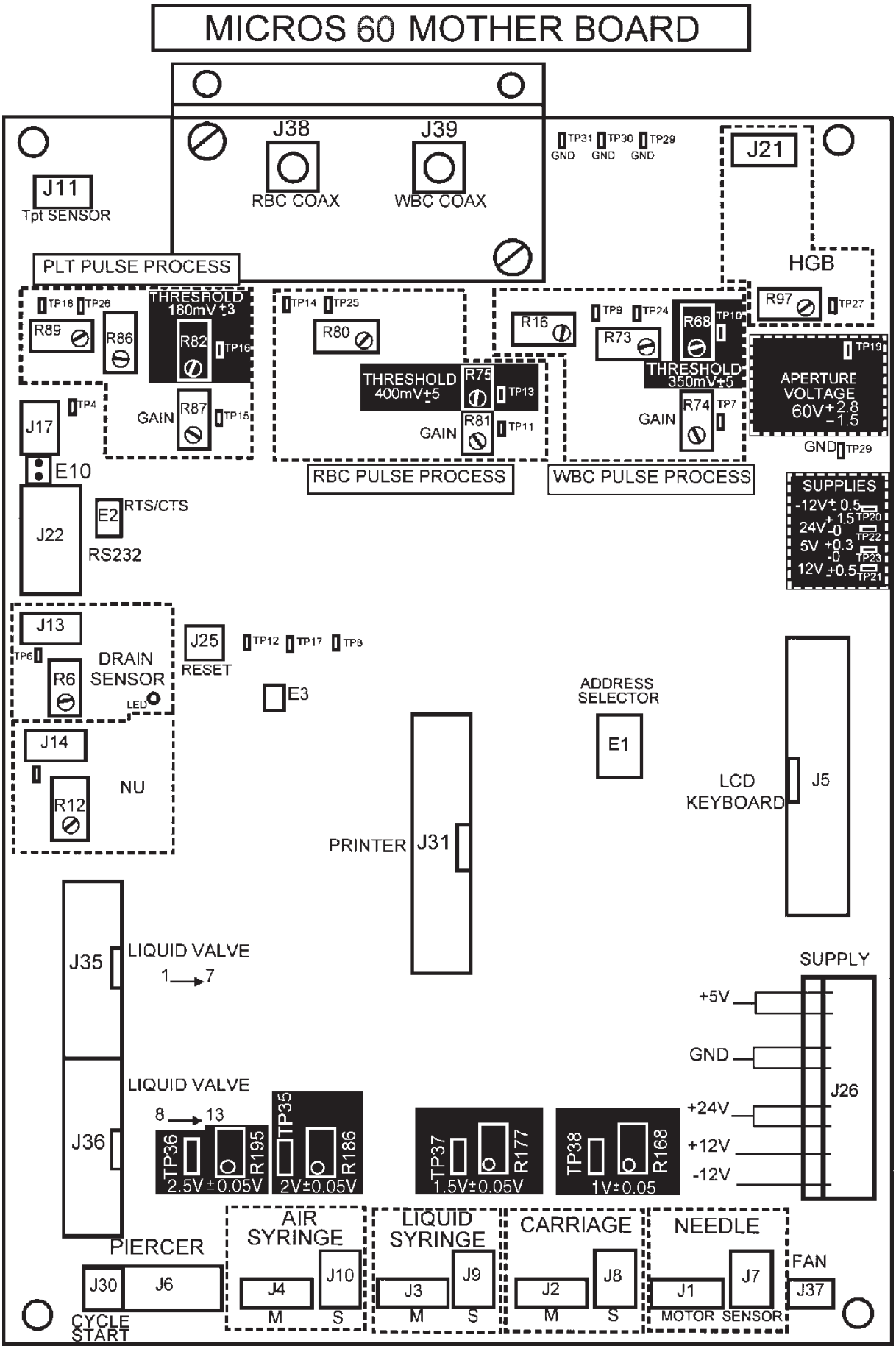
H - CALIBRATION

✓ **Calibration passed :**
Check that the calibration coefficients remain within the following ranges :

LIMITS	WBC	RBC	HGB	HCT	PLT	MPV	RDW	PDW
MINIMUM	0.80	0.65	1.10	0.83	0.86	0.75	0.75	0.75
MEAN	1.00	0.81	1.38	1.04	1.07	0.94	1.00	1.00
MAXIMUM	1.20	0.97	1.66	1.25	1.28	1.13	1.25	1.25

I - QUALITY CONTROL

✓ Run a blood control
✓ Option : QC smart card use


MICROS 60 MOTHER BOARD
J38
RBC COAX
J39
WBC COAX
TP31 GND
TP30 GND
TP29 GND
J21
J11
Tpt SENSOR
PLT PULSE PROCESS
HGB
R97
TP27
TP18
TP26
R89
R86
THRESHOLD 180mV ±3
R82
TP16
GAIN
R87
TP15
J17
TP4
E10
J22
E2
RTS/CTS
RS232
TP14
TP25
R80
THRESHOLD 400mV±5
R75
TP13
GAIN
R81
TP11
RBC PULSE PROCESS
R16
TP9
TP24
R73
R68
TP10
THRESHOLD 350mV±5
GAIN
R74
TP7
WBC PULSE PROCESS
TP19
APERTURE VOLTAGE 60V +2.8 -1.5
GND TP29
SUPPLIES
-12V ± 0.5 TP20
24V +1.5 -0 TP22
5V +0.3 -0 TP23
12V ±0.5 TP21
J13
TP6
DRAIN SENSOR
LED
R6
J25
RESET
TP12
TP17
TP8
E3
J14
NU
R12
ADDRESS SELECTOR
E1
PRINTER
J31
LCD KEYBOARD
J5
J35
LIQUID VALVE
1 → 7
J36
LIQUID VALVE
8 → 13
TP36
R195
2.5V ±0.05V
TP35
R186
2V±0.05V
TP37
R177
1.5V±0.05V
TP38
R168
1V±0.05
SUPPLY
+5V
GND
+24V
+12V
-12V
J26
PIERCER
J30
J6
CYCLE START
AIR SYRINGE
J4
M
J10
S
LIQUID SYRINGE
J3
M
J9
S
CARRIAGE
J2
M
J8
S
NEEDLE
J1
MOTOR
J7
SENSOR
FAN
J37

DECONTAMINATION

MICROS 60

Hématologie

01/05/98

• CONCERNS

Instrument decontamination before maintenance operation in the following cases
- Instrument move out of the biologic risks area
- Maintenance intervention on contaminate suspected assemblies

• REQUIRED TOOLS

Hexagonal keys
Clamps
Flat screw driver
Torx keys

• REQUIRED PRODUCTS

Fungicidal, bactericidal, virus killing detergent spray, non corrosive for metals, Non plastic altering.
Bleach solution 12°Cl
Deionize water
Protection gloves
Absorbant paper
Distilled water

• INTERVENTION TIME

1h35min

• FREQUENCY

On request

• SPECIFIC KIT OR CONSUMABLES

Drain and rinse kit **XEA 349 AS** for Pack equipped instrument

• PROCEDURE

WARNING !

- Disposal gloves and white coat must be worn by the operator.
- Local or national regulations must be applied in all the operations .

1 - Preliminary (20min)

- Switch on the instrument
- Run a STARTUP cycle, then a SERVICE / AUTOCLEAN
- Switch off the instrument and remove the supplying cable
- Open the instrument cover
- Spray the bactericidal cleaner on all assemblies that may provide biologic risks and wait for 10 minutes (assemblies in contact with the operator such as instrument cover, tube holder, keyboard, start key, sampling needle neighboured assemblies...

2 - Manual decontamination (20 min)

- Remove the WBC/HGB chamber cover
- Dilute the 12°cl bleach to 1 part of bleach for 4 of deionize water (1/5).
- Instrument environment must be cleaned and decontaminated.
- No sponge, nor cloth must be used. Only absorbant paper, thrown after use, in contamination bins, can be employed. For small or weak assemblies use accurate drier papers.
- All assemblies that is suspected to have contact with biologic product must be disinfected with the diluted bleach (the stainless steel must bleached below 30°Celsius).
- Blood stains or salt marks must be cleaned with spray detergent first.

• *Concerned assemblies*

- Outer surfaces of the instrument (perpex, covers, LCD, reagent locations....)
- Keyboards
- Waste connector plug
- Liquid valve push
- Needle neighboured assemblies
- Tube holder assy.
- overflow trays

Reinstall all the assemblies and setup the instrument in its initial configuration.

3 - Analysis circuit decontamination (30 min)

• BOTTLE VERSION

- Prepair 1 bottle containing 1/2 litre of bleach diluted to 1 part of bleach for 9 parts of deionize water (1/10).
- Prepair 1 bottle containing 1/2 litre of distilled water.
- Switch on the instrument
- Replace the reagent bottles by the diluted bleach bottle.
- Run a SERVICE / PRIME / ALL REAGENTS cycle.
- Fill a sample tube with diluted bleach to 1 part of bleach for 4 of deionize water (1/5).
- Enter the TECHNICIAN / BURN-IN function, Type in 15 cycles and leave the instrument operating until it stops (On MICROS 60 OT run 15 manual cycles).

• PACK VERSION

- Prepair 1 bottle containing 1/2 litre of bleach diluted to 1 part of bleach for 9 parts of deionize water (1/10).
- Prepair 1 bottle containing 1/2 litre of distilled water.
- Prepair one empty bottle of 1 litre for waste.
- Switch on the instrument
- Replace the reagent pack by the Drain & Rinse kit (XEA 349 AS).
- Plunge the straws into the diluted bleach bottle and the waste tube into the empty waste bottle.
- Run a SERVICE / PACK / PRIME cycle.
- Fill a sample tube with diluted bleach to 1 part of bleach for 4 of deionize water (1/5).
- Enter the TECHNICIAN / BURN-IN function, Type in 15 cycles and leave the instrument operating until it stops (On MICROS 60 OT run 15 manual cycles).

4 - Drain and rinse (30 min)

- Remove the 3 reagent straws from the bottle containing the diluted bleach
- Wrap the straws in absorbant paper.
- Run two prime cycles : the bleach is drained.
- Replace the diluted bleach by the distilled water bottle and re-plunge the straws in distilled water.
- Run six PRIME / ALL REAGENTS cycles (Rinse).
- Remove the 3 reagent straws from the distilled water (Wrap the straws in absorbant paper).
- Run two PRIME / ALL REAGENTS cycles : the distilled water is drained.
- Run a STAND BY cycle.
- Re-install the reagent bottles and the straws (or re-install the Pack instead of the Drain & Rinse kit).
- Switch off the instrument.
- Close the instrument cover.

DRAIN & RINSE

MICROS 60

Hématologie

05/10/98

• CONCERNS

Instrument Rinse and drain before
- an extended shutdown
- an instrument removing

• REQUIRED TOOLS

None

• REQUIRED PRODUCTS

Distilled water

• INTERVENTION TIME

35min

• FREQUENCY

On request

• SPECIFIC KIT OR CONSUMABLES

Drain & rinse kit : **XEA 349 AS** for Pack equipped instrument
ADVIA Pack optional : Reagent output protections FFZ 015 A

MICROS 60

• PROCEDURE

WARNING !

- Disposal gloves and white coat must be worn by the operator.
- Local or national regulations must be applied in all the operations .

1 - Preliminary (5min)

- Switch on the instrument
- Run a STARTUP cycle, then a SERVICE / AUTOCLEAN

2 - Drain and rinse (30 min)

• BOTTLE VERSION

- Prepair one bottle containing 1/2 litre of distilled water
- Remove the 3 reagent straws MINIDIL, MINILYSE, MINICLEAN from the bottles.
- Wrap the straws in absorbant paper.
- Run two PRIME / ALL REAGENTS cycles : the reagents are drained.
- Replace the reagent bottles by the distilled water bottle and plunge the straws into distilled water.
- Run 6 PRIME / ALL REAGENTS cycles (Rinse).
- Remove the 3 reagent straws from the distilled water (Wrap the straws in absorbant paper).
- Run two PRIME / ALL REAGENTS cycles : the distilled water is drained.
- Run a STAND BY cycle.
- Check that the diluent syringe piston is in park position (upper position).
- Remove the distilled water and install the installation kit box instead.
- Install the black plastic carriage locking clip in order to block the needle carriage (see INSTALLATION procedures :
  MICROS 60 CT : RAS 166 A
  MICROS 60 OT : RAS 165 A)
- Clean the reagent stains from the instrument.
- Put an adhesive tape on the tube holder door (MICROS 60 CT) to prevent from opening it.
- Switch the instrument off.

• PACK VERSION

- Prepair one bottle containing 1/2 litre of distilled water.
- Prepair one empty bottle of 1/2 litre for waste.
- Install the Drain & Rinse kit (XEA 349 AS) instead of the Reagent pack.
- Plunge the waste tube into the empty waste bottle.
- Wrap the 3 reagent straws MINIDIL, MINILYSE, MINICLEAN in absorbant paper.
- Run two SERVICE / PACK / PRIME cycles : the reagents are drained.
- Plunge the straws into distilled water.
- Run 6 SERVICE / PACK / PRIME cycles (Rinse).
- Remove the 3 reagent straws from the distilled water (Wrap the straws in absorbant paper).
- Run two SERVICE / PACK / PRIME cycles : the distilled water is drained.
- Run a STAND BY cycle.
- Check that the diluent syringe piston is in park position (upper position).
- Remove the Drain & rinse kit.
- Switch off the instrument.
- Install the black plastic carriage locking clip in order to block the needle carriage (see INSTALLATION procedures :
  MICROS 60 CT : RAS 166 A
  MICROS 60 OT : RAS 165 A)
- Clean the reagent stains from the instrument.
- Put an adhesive tape on the tube holder door (MICROS 60 CT) to prevent from opening it.
- Switch the instrument off.

NOTE ADVIA : Install the reagent ouput protections (see the warning sheet form : RAL 035 A and join it to the installation kit box)

- Install the installation kit box on the pack location.

Piercing block maintenance

MICROS 60 CT

Hématologie

15/06/98

• CONCERNS

- Sampling position and available tubes
- Piercing block description
- Maintenance

• REQUIRED TOOLS

- Torx keys

• REQUIRED PRODUCTS

- See decontamination procedure : RAS 192 A

• INTERVENTION TIME

- 30 min

• FREQUENCY

- On request

• SPECIFIC KIT OR CONSUMABLES

- None

- PROCEDURE

1 - Sampling position

Diag.1

According to the sample tube models (Vacutainers, Microtainers ...) used and to their position into the sample tube holder, the heigth of the needle in its lower position can be modified.

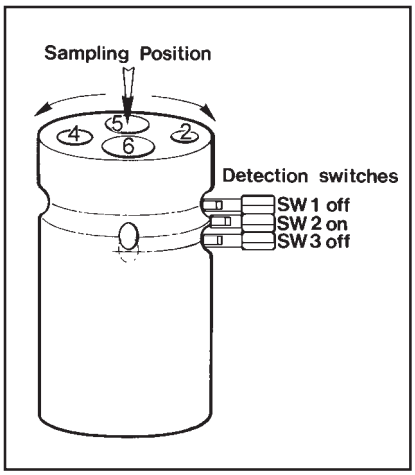
The 3 switches (diag 1) associated to the tube holder are able to detect the sampling position according to the following principle :

Two states 0/1 are possible for the 3 switches (see diag 2) :

- Switched OFF : 1
- Switched ON : 0

The binary codes obtained from the states of the switches gives the positions of the tube holder.

For each position of the sample tube holder (from 1 to 6) corresponds a position of the needle (from 1 to 6).



Diag.2

SWITCH 1	SWITCH 2	SWITCH 3	Sampling position	Needle
0	0	0	Bad position of the tube holder	
1	0	0	position 1	Needle 1
0	1	0	position 2	Needle 2
1	1	0	position 3	Needle 3
0	0	1	position 4	Needle 4
1	0	1	position 5	Needle 5
0	1	1	position 6	Needle 6
1	1	1	No tube holder	

NOTE The code «0 0 0» means that the tube holder has been turned in between two sampling positions. The code «1 1 1» means that the tube holder has been removed.

Piercing block maintenance

The following chart tables give the tube positions available according to the models of sample holder used on the instrument

MICROS 60 STANDARD TUBE HOLDER

Diag.3

Diag.4

Barrillet standard (GBC061AS) *Standard Tube holder*	Marque *Trademark*	Additif *Additive*	Volume *Volume*	Vide *Vacuum*	Volume mort (5) Dead volume	Ref. *P/N*	Modèle *Model*	Photo N° *Photo #*	Réglage (1) *Adjustment*	Perçage tube *Tube piercing*	Bouchon (2) *Stopper*
POSITION 6 CONTROLE	R&D system	na	2ml	na	250µl	na	na	8	standard	sans bouchon without stopper	
POSITION 5 STANDARD	Becton D.	EDTA-K3	5ml	nc	390µl	368452	Vacutainer	9	standard	avec bouchon with stopper	gomme *rubber*
	Becton D.	EDTA-K3	5ml	2ml	400µl	367651	Vacutainer	11	standard	avec bouchon with stopper	hemogard
	Becton D.	EDTA-K3	5ml	3ml	410µl	367856	Vacutainer	10	standard	avec bouchon with stopper	hemogard
	Becton D.	EDTA-K3	5ml	3ml	400µl	367652	Vacutainer	12	standard	avec bouchon with stopper	hemogard
	Becton D.	EDTA-K3	5ml	4.5ml	410µl	367654	Vacutainer	7	standard	avec bouchon with stopper	hemogard
	Terumo	EDTA-K2	5ml	3ml	430µl	VP-053SDK	Venoject II	15	standard	avec bouchon with stopper	Ultraseal
	Terumo	EDTA-K3	5ml	5ml	460µl	VT-050STK	Venoject	17	standard	avec bouchon with stopper	gomme *rubber*
	Terumo	EDTA-K3	5ml	3ml	460µl (4)	VT-053STK	Venoject	na	standard	avec bouchon with stopper	gomme *rubber*
	ABX	EDTA-K3	5ml	4ml	480µl	ABX-3004002	na	14	standard	avec bouchon with stopper	gomme (non recommandé) *rubber (not recommended)*
	Greiner	EDTA-K3	5ml	2ml	370µl (4)	454087	Vacuette	na	standard	avec bouchon with stopper	hemogard
	Greiner	EDTA-K3	5ml	3ml	370µl (4)	454086	Vacuette	na	standard	avec bouchon with stopper	hemogard
	Greiner	EDTA-K3	5ml	4ml	370µl	454036	Vacuette	13	standard	avec bouchon with stopper	hemogard
	LDM	EDTA-KE	5ml	4.5ml	480µl	nc	nc	2	standard	avec bouchon with stopper	hemogard
POSITION 4	Becton D.	EDTA-K3	3ml	na	30µl	6385	Vacutainer	6	standard	sans bouchon (3) without stopper	gomme (non recommandé) *rubber (not recommended)*
	Terumo	EDTA-K3	3ml	3ml	30µl	VT-030STK	Venoject	16	standard	avec bouchon with stopper	gomme (non recommandé) *rubber (not recommended)*
POSITION 2	Sarstedt	nc	0.5ml	na	30µl	901091	nc	4	standard	sans bouchon without stopper	bouchon imperdable *unlostable stopper*
	ABX	nc	0.5ml	na	30µl	ABX-3001001	nc	5	standard	sans bouchon without stopper	bouchon imperdable *unlostable stopper*

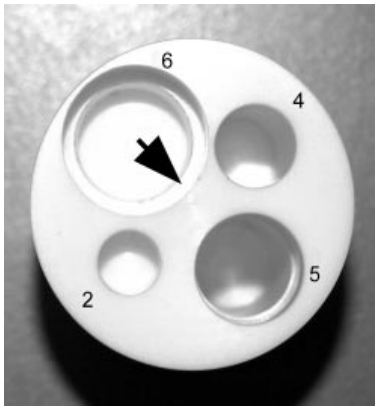
Table 1

CAUTION

The needle sampling position must not be modified without refering to the procedure RAS 176 A.

MICROS 60 CT

ADVIA 60 STANDARD TUBE HOLDER



Diag.5

Diag.6

Barrillet standard (GBC216AS) *Standard Tube holder*	Marque *Trademark*	Additif *Additive*	Volume *Volume*	Vide *Vacuum*	Volume mort (5) Dead volume	Ref. *P/N*	Modèle *Model*	Photo N° *Photo #*	Réglage (1) *Adjustment*	Perçage tube *Tube piercing*	Bouchon (2) *Stopper*
POSITION 6 CONTROLE	STRECK	nc	nc	nc	nc	nc	nc	18	standard	avec bouchon with stopper	nc
	R&D system	na	2ml	na	250µl	na	na	8	standard	sans bouchon without stopper	
POSITION 5 STANDARD	Becton D.	EDTA-K3	5ml	nc	390µl	368452	Vacutainer	9	standard	avec bouchon with stopper	gomme *rubber*
	Becton D.	EDTA-K3	5ml	2ml	400µl	367651	Vacutainer	11	standard	avec bouchon with stopper	hemogard
	Becton D.	EDTA-K3	5ml	3ml	410µl	367856	Vacutainer	10	standard	avec bouchon with stopper	hemogard
	Becton D.	EDTA-K3	5ml	3ml	400µl	367652	Vacutainer	12	standard	avec bouchon with stopper	hemogard
	Becton D.	EDTA-K3	5ml	4.5ml	410µl	367654	Vacutainer	7	standard	avec bouchon with stopper	hemogard
	Terumo	EDTA-K2	5ml	3ml	430µl	VP-053SDK	Venoject II	15	standard	avec bouchon with stopper	Ultraseal
	Terumo	EDTA-K3	5ml	5ml	460µl	VT-050STK	Venoject	17	standard	avec bouchon with stopper	gomme *rubber*
	Terumo	EDTA-K3	5ml	3ml	460µl (4)	VT-053STK	Venoject	na	standard	avec bouchon with stopper	gomme *rubber*
	ABX	EDTA-K3	5ml	4ml	480µl	ABX-3004002	na	14	standard	avec bouchon with stopper	gomme (non recommandé) *rubber (not recommended)*
	Greiner	EDTA-K3	5ml	2ml	370µl (4)	454087	Vacuette	na	standard	avec bouchon with stopper	hemogard
	Greiner	EDTA-K3	5ml	3ml	370µl (4)	454086	Vacuette	na	standard	avec bouchon with stopper	hemogard
	Greiner	EDTA-K3	5ml	4ml	370µl	454036	Vacuette	13	standard	avec bouchon with stopper	hemogard
	LDM	EDTA-KE	5ml	4.5ml	480µl	nc	nc	2	standard	avec bouchon with stopper	hemogard
POSITION 4	Becton D.	EDTA-K3	3ml	na	30µl	6385	Vacutainer	6	standard	sans bouchon (3) without stopper	gomme (non recommandé) *rubber (not recommended)*
	Terumo	EDTA-K3	3ml	3ml	30µl	VT-030STK	Venoject	16	standard	avec bouchon with stopper	gomme (non recommandé) *rubber (not recommended)*
POSITION 2	Sarstedt	nc	0.5ml	na	30µl	901091	nc	4	standard	sans bouchon without stopper	bouchon imperdable *unlostable stopper*
	ABX	nc	0.5ml	na	30µl	ABX-3001001	nc	5	standard	sans bouchon without stopper	bouchon imperdable *unlostable stopper*

Table 2

OPTIONAL TUBE HOLDER

Diag.8

Diag.9

Groove

Barrillet optionnel (GBC217AS) *Optional Tube holder*	Marque *Trademark*	Additif *Additive*	Volume *Volume*	Vide *Vacuum*	Volume mort (5) Dead volume	Ref. *P/N*	Modèle *Model*	Photo N° *Photo #*	Réglage (1) *Adjustment*	Perçage tube *Tube piercing*	Bouchon (2) *Stopper*
POSITION 6 CONTROLE	R&D system	na	2ml	na	250µl	na	na	8	standard	sans bouchon *without stopper*	na
POSITION 5 STANDARD	Becton D.	EDTA-K3	5ml	nc	390µl	368452	Vacutainer	9	standard	avec bouchon *with stopper*	gomme *rubber*
	Becton D.	EDTA-K3	5ml	2ml	400µl	367651	Vacutainer	11	standard	avec bouchon *with stopper*	hemogard
	Becton D.	EDTA-K3	5ml	3ml	410µl	367856	Vacutainer	10	standard	avec bouchon *with stopper*	hemogard
	Becton D.	EDTA-K3	5ml	3ml	400µl	367652	Vacutainer	12	standard	avec bouchon *with stopper*	hemogard
	Becton D.	EDTA-K3	5ml	4.5ml	410µl	367654	Vacutainer	7	standard	avec bouchon *with stopper*	hemogard
	Terumo	EDTA-K2	5ml	3ml	430µl	VP-053SDK	Venoject II	15	standard	avec bouchon *with stopper*	Ultraseal
	Terumo	EDTA-K3	5ml	5ml	460µl	VT-050STK	Venoject	17	standard	avec bouchon *with stopper*	gomme *rubber*
	Terumo	EDTA-K3	5ml	3ml	460µl (4)	VT-053STK	Venoject	na	standard	avec bouchon *with stopper*	gomme *rubber*
	ABX	EDTA-K3	5ml	4ml	480µl	ABX-3004002	nc	14	standard	avec bouchon *with stopper*	gomme (non recommandé) *rubber (not recommended)*
	Greiner	EDTA-K3	5ml	2ml	370µl (4)	454087	Vacuette	na	standard	avec bouchon *with stopper*	hemogard
	Greiner	EDTA-K3	5ml	3ml	370µl (4)	454086	Vacuette	na	standard	avec bouchon *with stopper*	hemogard
	Greiner	EDTA-K3	5ml	4ml	370µl	454036	Vacuette	13	standard	avec bouchon *with stopper*	hemogard
	LDM	EDTA-KE	5ml	4.5ml	480µl	nc	nc	2	standard	avec bouchon *with stopper*	hemogard
POSITION 3	Becton D.	nc	0.5ml	na	30µl	365975	Microtainer	3	avec tube with tube	sans bouchon *without stopper*	Microgard (Equipé adapteur: autre réglage aiguille) *(Equipped with adaptor: other adjustment)*
POSITION 1	Becton D.	nc	0.5ml	na	30µl	365973	Microtainer	1	standard	sans bouchon *without stopper*	na

Table 3

MICROS 60 CT

na - not applicable.

nc - not communicated.

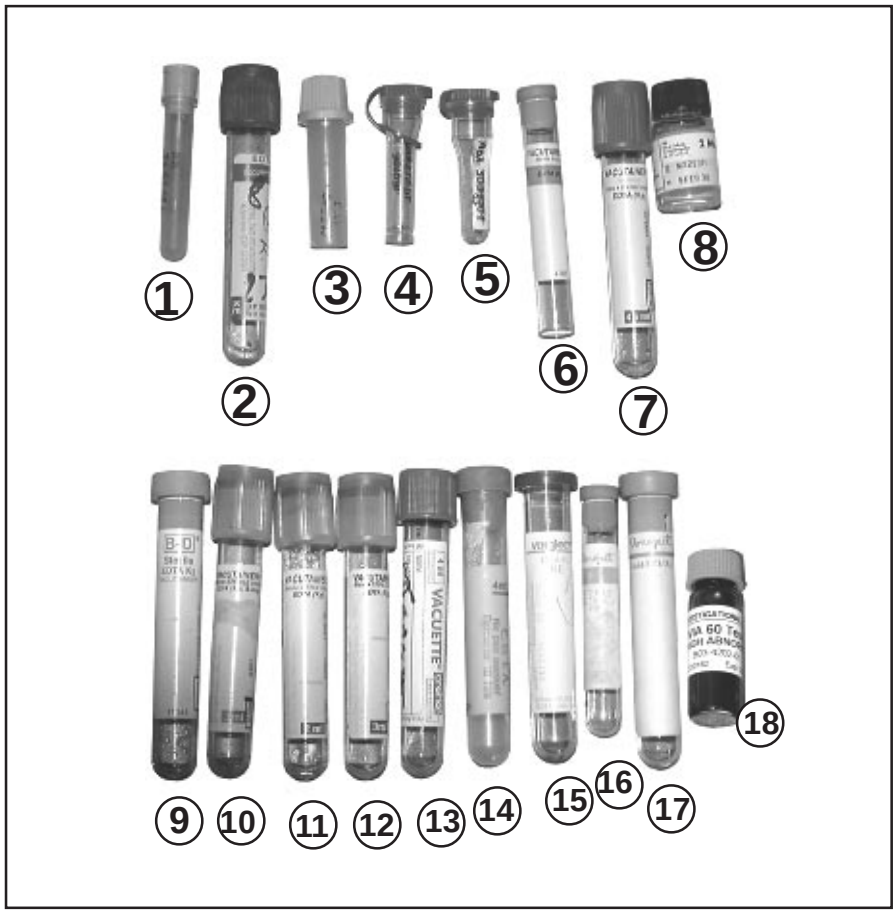
(1) - The standard adjustment positions the needle at the bottom of the tube holder, when mentioned "with tube", the presence of the tube is mandatory for the adjustment.

(2) - More information about sample tube is available in the user manual, section 3 "SPECIFICATIONS", point 3.4.2.

(3) - The thickness of the tube stopper blocks the tube into the piercing mechanism.

(4) - These volumes have been calculated; not measured.

(5) - The "dead volume" is determined after the manual adjustment of the sampling depth and increased by 20%, except in the pediatric tubes where a 30µl volume has been fixed arbitrarily for security.

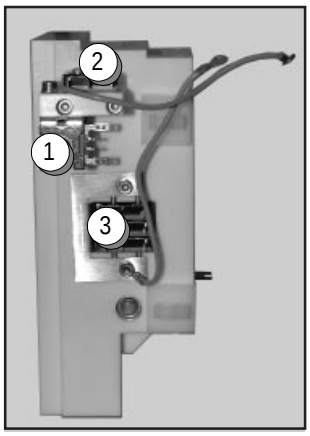


Diag.10

NOTE The needle heigth adjustments is explained in the procedure RAS 176 A.

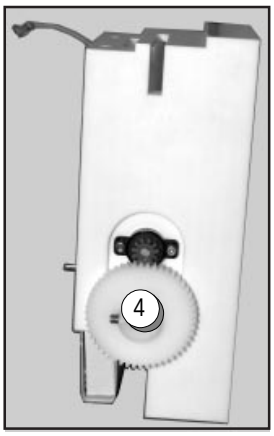
3 - Description

Piercing block
right hand side view



Diag.11

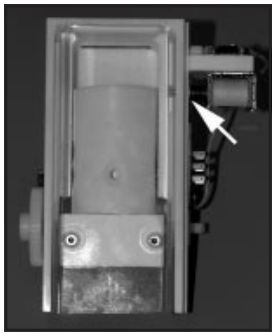
Piercing block
left hand side view



Diag.12

1. Door lock electro magnet
2. Door detection switch
3. Sampling position switches
4. Gearings

2 - Maintenance

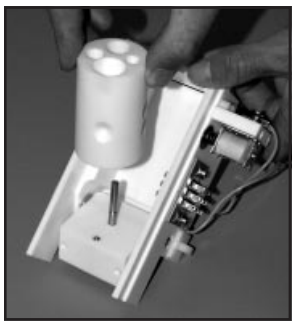


Diag.13

- Control the correct operation of the door lock electro magnet (diag 13).

Diag.14

- To clean the piercing block it is easier to dismantle the door front panel as shown on the diag 14.



Diag.15

- The sample tube holder can be pulled out from its location as shown on diagram 15.
- Re-install the reverse order.

CAUTION

Decontamination procedure (RAS 192 A) must be followed to clean the sample tube holder and its location.

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4 . OUTPUT FORMAT

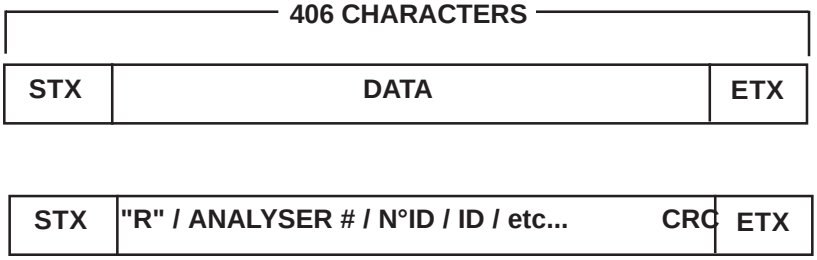
3 RS ouput formats are available on MICROS 60 :

- Format 1 : ARGOS / HELIOS type
- Format 2 : ABX internal format (factory use)
- Standard format
- TR off : Transmission off

1. ARGOS FORMAT PRINCIPLES

1.1. Introduction

The ARGOS format is a fixed format (406 characters for one result) including a STX and a ETX. These characters are splitted into fields representing a transmitted item.



The fields have a fixed length separated by the /**OD** character.

1.2. Results characteristics

1.2.1. Key

Total ASCII characters emitted : 406

- (-) : Space $20
- (]) : Carriage return $0D

- CRC : exclusive "OR" of all the transmitted bytes except ETX and STX, then an inclusive "OR" with a $4O value.

- zzzzz : numeric field completed by zeros on the left.
  ex : 04.55 (decimal separation with a period).
  When the analyser does not transmit parameters, the field (zzzzz) is put in place of (--.--).

- Y : Alphanumeric character from $20 to $7F.

- # : Space ($20) if automatic sampling. Star ($2A) if manual sampling.

1.2.2. Result format

Line 1 :	STX ($02)		Start of text	1
Line 2 :	R ($52)		Character "R"	1
Line 3 :	zz]		Analyser No	2 + 1
Line 4 :	YYYYYYYYYYYYYYY]		Identification No	16 + 1
Line 5 :	YYYYYYYYYYYYYYYYYYYYYYYYYYYYY]		Identification	30 + 1
Line 6 :	zz/zz/zz-zzhzzmnzzs#]		Time & Date	20 + 1
Line 7 :	zzzzz-RN]	GB	rejection & limits	8 + 1
Line 8 :	zzzzz-RN]	LYC#	rejection & limits	8 + 1
Line 9 :	zzzzz-RN]	LYC%	rejection & limits	8 + 1
Line 10 :	zzzzz-RN]	MON#	rejection & limits	8 + 1
Line 11 :	zzzzz-RN]	MON%	rejection & limits	8 + 1
Line 12 :	zzzzz-RN]	GRA#	rejection & limits	8 + 1
Line 13 :	zzzzz-RN]	GRA%	rejection & limits	8 + 1
Line 14 :	zzzzz-RN]	NEU#	rejection & limits	8 + 1
Line 15 :	zzzzz-RN]	NEU%	rejection & limits	8 + 1
Line 16 :	zzzzz-RN]	EOS#	rejection & limits	8 + 1
Line 17 :	zzzzz-RN]	EOS%	rejection & limits	8 + 1
Line 18 :	zzzzz-RN]	BAS#	rejection & limits	8 + 1
Line 19 :	zzzzz-RN]	BAS%	rejection & limits	8 + 1
Line 20 :	zzzzz-RN]	ALY#	rejection & limits	8 + 1
Line 21 :	zzzzz-RN]	ALY%	rejection & limits	8 + 1
Line 22 :	zzzzz-RN]	LIC#	rejection & limits	8 + 1
Line 23 :	zzzzz-RN]	LIC%	rejection & limits	8 + 1
Line 24 :	zzzzz-RN]	RET*	rejection & limits	8 + 1
Line 25 :	zzzzz-RN]	RET*	rejection & limits	8 + 1
Line 26 :	zzzzz-RN]	RET*	rejection & limits	8 + 1
Line 27 :	zzzzz-RN]	RET*	rejection & limits	8 + 1
Line 28 :	zzzzz-RN]	RBC	rejection & limits	8 + 1
Line 29 :	zzzzz-RN]	HGB	rejection & limits	8 + 1
Line 30 :	zzzzz-RN]	HCT	rejection & limits	8 + 1
Line 31 :	zzzzz-RN]	MCV	rejection & limits	8 + 1
Line 32 :	zzzzz-RN]	MCH	rejection & limits	8 + 1
Line 33 :	zzzzz-RN]	MCHC	rejection & limits	8 + 1
Line 34 :	zzzzz-RN]	RDW	rejection & limits	8 + 1
Line 35 :	zzzzz-RN]	RET*	rejection & limits	8 + 1
Line 36 :	zzzzz-RN]	PLT	rejection & limits	8 + 1
Line 37 :	zzzzz-RN]	MPV	rejection & limits	8 + 1
Line 38 :	zzzzz-RN]	PCT	rejection & limits	8 + 1
Line 39 :	zzzzz-RN]	PDW	rejection & limits	8 + 1
Line 40 :	ABCDEFGHIJKLMNOPQRSTU]		WBC 5 DIFF Flags	21 + 1
Line 41 :	LMMGGG]		WBC LMG Flags	6 + 1
Line 42 :	PSM]		PLT Flags	3 + 1
Line 43 :	CRC			1
Line 44 :	ETX ($03)		end of text	1

1.2.3. End of communication key

- (J) : Carriage return $0D

- CRC : the exclusive «OR» of all the transmitted bytes, except ETX and STX, then the inclusive «OR» with a $40 value.

- zz : Number of the analyser.

2. STANDARD FORMAT

The **standard format** can have a different a different number of fields according to the transmitted items setup by the user (results, curves, flags, etc...).

2.1 Message Structure

STX
Size + carriage return.

Identifier followed by heading title + carriage return.
Identifier followed by the Information associated to the heading title + carriage return.
Remainder of the other Identifiers and Informations associated to the heading title + carriage returns.

Other heading titles + associated Informations
.....

Identifier followed by the Checksum + carriage return
ETX

2.2. Details about the structure

Size :	5 bytes representing the total amount of the data except STX and ETX.
Heading title :	An 8 characters chain preceded by a space, indicating the associated data type.
Identifier :	1 byte (moving about $21 to $FF, it describes the information type which follows this indicator).
CheckSum :	Sum modulo 65535 of all the characters except ETX, STX and all the infor mations linked to the checksum (identifier - space - checksum) in the hexadecimal format on 4 bytes, preceded by a space.

2.3. Identifier list and their formats

2.3.1. Hematologyc numeric parameters

2.3.1.1. Format description

• Numerical field
For all indicated parameters from $21 to $43, the format is a numerical field of 5 digits completed with zeros on the left side (ex. : 04.55) and preceded by a space.
The unit is the one chosen by the operator.
When the parameter cannot be calculated by the analyzer, the field is replaced with (—.—).

• Parameter status
Following the numerical field, a first digit gives the counting rejection status or the suspicion, a second one gives the parameter value status according to high and low normalities, and to the overloading capacities.

First digit (letter)	correspondance
R	Parameter rejected for a counting default
S	Suspicious parameter value
'space'	No anomaly observed
Second digit (letter)	correspondance
l	Parameter < to the low normal value
'space'	Parameter normal value
h	Parameter > to the high value
O	Parameter exceeding the capacity

• Example

5.5 millions RBC with a counting error in the standard units :
$32 $20 $30 $35 $2E $35 $30 $52 $68 $0D or **«2 05.5Rh»** + carriage return.
The length is fixed and is worth 2+7+1, that is to say 10 bytes for one parameter.

2.3.1.2. Identifier list

Identifiers		Parameters	Units
$21	!	WBC	Standard - SI g/dl - SI mmoles
$22	"	Lymphocytes	(#)
$23	#		(%)
$24	$	Monocytes	(#)
$25	%		(%)
$26	&	Granulocytes	(#)
$27	'		(%)

Identifiers		Parameters	Units
$32	2	RBC	Standard - SI g/dl - SI mmoles
$33	3	HGB	
$34	4	HCT	
$35	5	MCV	
$36	6	MCH	
$37	7	MCHC	
$38	8	RDW	

Identifiers		Parameters	Units
$40	@	PLT	Standard - SI g/dl - SI mmoles
$41	A	MPV	
$42	B	THT	
$43	C	PDW	

2.3.2. Pathology

** Flags associated with parameters*

• Format description

Flags are transmitted in a comprehensive mode, preceded by a space (same presentation than on the screen, i.e. dependant from the language) 2 characters which are replaced with spaces when the flag has not been detected.

• Identifier list

Identifiers		Parameters	Formats	Length
$50	P	WBC or LMG	L1M1M2G1G2G3	2 + 12 + 1
$53	S	PLT	PcScMc	2 + 6 + 1

2.3.3. Histograms and matrix

2.3.3.1. Format description

• Histograms

Histograms are transmitted on 128 or 256 channels, preceded by a space. They are automaticaly rescaled to a 223 maximum amplitude value.
The zero amplitude value is $20, the maximum amplitude value is $FF.

2.3.3.2. Identifier list

Identifiers		Parameters	Formats	Length
$57	W	WBC	Amplitude of each channel	2 + 128 + 1
$58	X	RBC	"	"
$59	Y	PLT	"	"
$5D	]	WBC thresholds	5 thresholds	1 + 20 + 1
$5E	^	RBC thresholds	2 thresholds	1 + 8 + 1
$5F	_	PLT thresholds	1 threshold	1 + 4 + 1

2.3.4. Patient result identification

2.3.4.1. Format description

All the described fields have a fixed size character chain type and are completed with spaces for the non significant informations.

2.3.4.2. Identifier list

Identifiers		Correspondance	Formats	Length
$70	p	Analyzer number	01	2 + 2 + 1
$71	q	Analysis date and time	94/06/06 13h15mn31s	2 + 19 + 1
$73	s	Analyzer sequence number	0128	2 + 4 + 1
$74	t	Sampling mode	'O' : open tube 'C' : close tube	2 + 1 + 1
$75	u	Identification number	1450302154275-42	2 + 16 + 1
$76	v	Identification	SMITH Ronald	2 + 30 + 1
$80	ç	Analysis type	Defined on 1 character (see description) 'A' CBC analysis 'D' LMG analysis From 'G' to 'Z' can be configurated by the user	2 + 1 + 1

2.3.4.3. Analysis type ($80)

This identifier defines the analysis type CBC, LMG to carried out on the sample. It also provides the analysis of one or several specific parameters.
The CBC analysis includes the 12 parameters of the CBC's count.
The LMG analysis includes the CBC analysis and the % and # of the 6 WBC populations.

2.4. Heading title

The heading title provides the data of the whole message : current hematological results or results coming from statistics. This heading title is able to drive commands that can be interpreted by the analyser or by an external computer.
Analyzers being able to communicate in the bidirectionnal mode and supporting the remote control mode, can interprete the heading title and runs the corresponding actions.
This string is a 8 characters length, preceded by a space, containing data that follows, or the command type to be carried out. The identifier is $FF.

Identifier		Correspondance	Format	Length
$FF		type of data packet	String of characters	2 + 8 + 1

Data exported by the analyzer

Data packet string	Use
RESULT	Hematological result transmission on a routine mode

2.5. Other identifiers

Identifiers		Correspondance	Format	Length
$FC		Number	On 8 bytes	2 + 8 + 1
$FD		Checksum value	hexadecimal on 4 Bytes	2 + 4 + 1

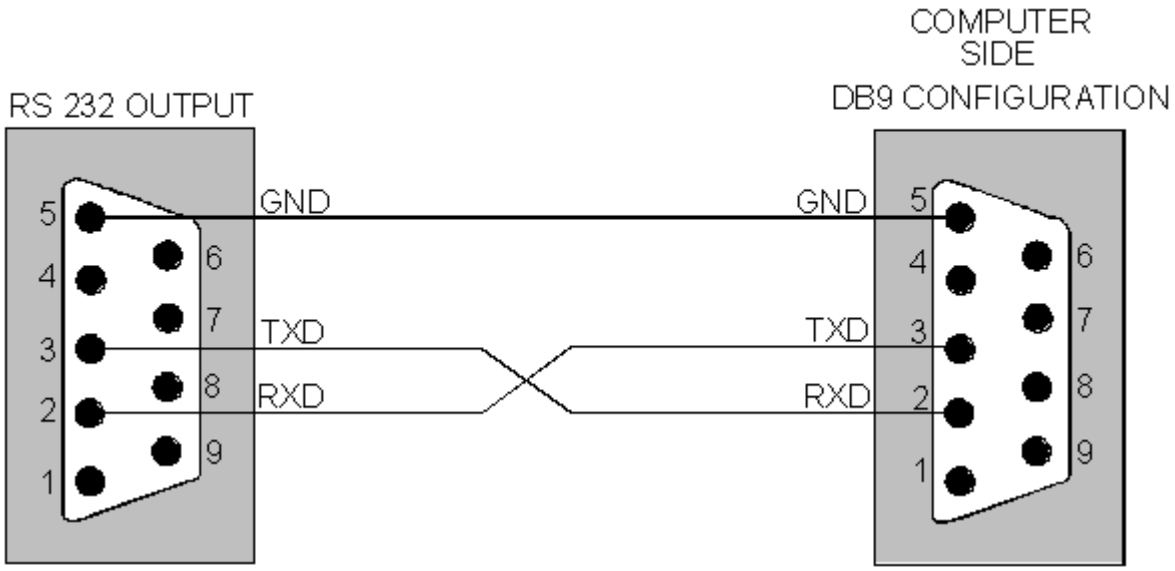
Identifier $FC : This identifier allows the number transmission that could be an error #, a position #, a burn-in sequence # or an hexadecimal status (see "Error list").
Identifier $FD : Checksum value : see chapter on the message constitution.

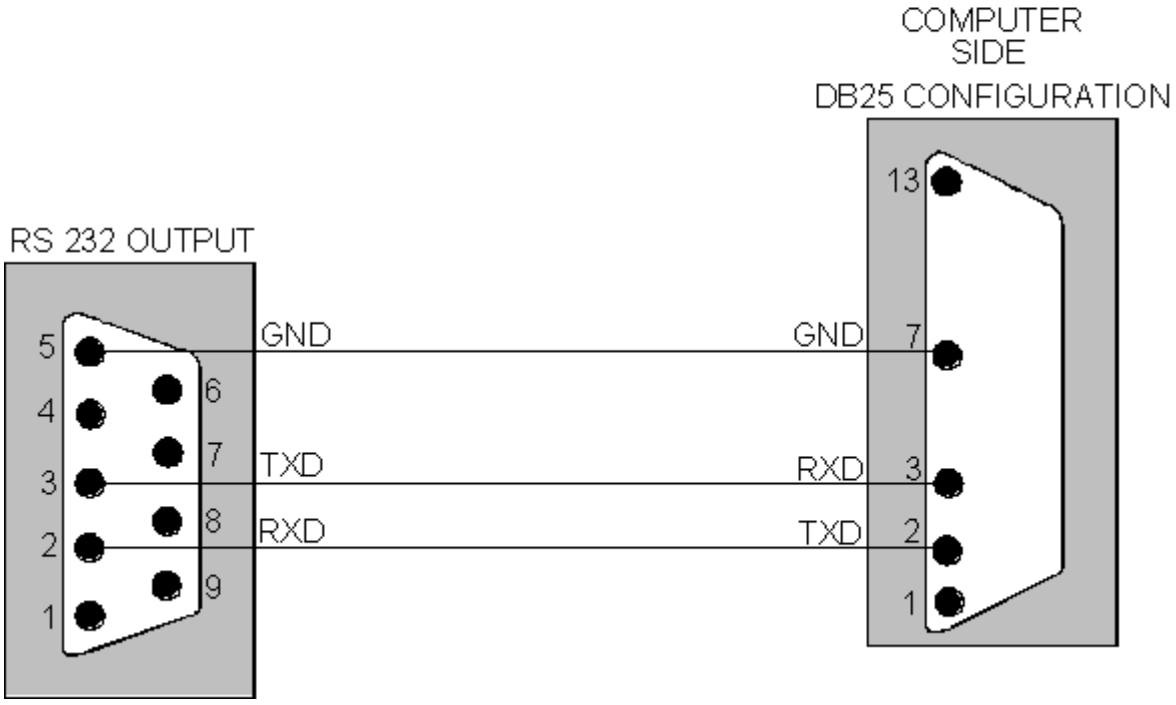
Error list

Error N°	event linked to the analyzer
1	Operating temperature out of limits

4 . OUTPUT FORMAT

3. PIN ASSIGNMENTS





5. TRAINING SLIDES